Fuzzy Monte Carlo Model for Transmission Power Systems Reliability Based Decision Making

by
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To Alexandra

With my deepest and true love

"As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality."

Albert Einstein

Abstract

This thesis presents the **F**uzzy **M**onte **C**arlo Model for **T**ransmission Power Systems **Rel**iability based studies (FMC-TRel) methodology, which is based on statistical failure and repair data of the transmission power system components and uses fuzzy-probabilistic modeling for system component outage parameters. Using statistical records allows developing the fuzzy membership functions of system component outage parameters. The proposed hybrid method of fuzzy set and Monte Carlo simulation based on the fuzzy-probabilistic models allows catching both randomness and fuzziness of component outage parameters.

A network contingency analysis to identify any overloading or voltage violation in the network is performed once obtained the system states. This is followed by a remedial action algorithm, based on Optimal Power Flow, to reschedule generations and alleviate constraint violations and, at the same time, to avoid any load curtailment, if possible, or, otherwise, to minimize the total load curtailment, for the states identified by the contingency analysis. For the system states that cause load curtailment, an optimization approach is applied to reduce the probability of occurrence of these states while minimizing the costs to achieve that reduction.

This methodology is of most importance for supporting the transmission system operator decision making, namely in the identification of critical components and in the planning of future investments in the transmission power system.

A case study based on Reliability Test System (RTS) 1996 IEEE 24 Bus is presented to illustrate with detail the application of the proposed methodology.

Keywords

Fuzzy model, Load curtailment, Monte Carlo simulation, Optimization, Reliability, Transmission Power Systems.

Resumo

Esta tese apresenta a metodologia Estudos baseados em Fiabilidade em Sistemas de Transporte de Energia através de um Modelo baseado em Lógica Difusa e simulação Monte Carlo (FMC-TRel), que é baseda nos dados estatisticos de defeitos e dos tempos de reparação correspondentes aos componentes do sistema de transporte de energia eléctrica. Os dados estatisticos permitem desenvolver as funções de lógica difusa dos parâmetros de falha dos componentes do sistema. O método hibrido baseado em lógica difusa e simulação de Monte Carlo permitem modelar tanto a aleatoriedade e a imprecisão dos parâmetros de falha dos componentes do sistema.

Uma vez obtidos os estados do sistema, é realizada uma analíse de contingências, baseada no trânsito de potências AC, para identificar se exixte alguma sobrecarga ou vilolação das tensões na rede. Isto é seguido por um algoritmo de medidas correctivas com base no Trânsito de Potências Óptimo, para reajustar a produção e aliviar a violação das restrições e, ao mesmo tempo, evitar o corte de carga, se possível, ou, caso contrario, para minimizar o corte de carga total para os estados identificados na análise de contingências. Para os estados que provocam corte de carga é aplicado um processo de optimização por forma a reduzir a probabilidade de ocorrência destes estados enquanto minimiza os custos para chegar a essa redução.

Esta metodologia é de grande importância para o apoio ao operador do sistema de transmissão na tomada de decisão, principalmente na identificação de componentes criticos e no planeamento de futuros investimentos no sistema de transporte de energia.

É apresentado um caso de estudo baseado no sistema de testes de fiabilidade de 24 barramentos do IEEE de 1996 é apresentado para ilustrar com detalhe a aplicação da metodologia proposta.

<u>Palavras Chave</u>

Modelos difusos, Corte de carga, Simulação de Monte Carlo, Optimização, Fiabilidade, Sistemas eléctricos de transporte de energia.

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1 Introduction

1.1 Research motivation

Power systems reliability performance is usually based on average customer interruption information. These average values are important to assess the risk of costumers being left without electrical energy, but do not give the probability of this situation occurrence [1-3]. The average annual indices give no insight on how reliability may vary from year to year in the presence of a random behavior of bulk power systems, mainly due to the weather conditions.

Power systems, including generation, transmission and distribution networks, allow getting the electrical energy produced in production centers to the end consumers. The reliability of power systems is the ability to deliver electricity to all delivery points within acceptable levels of quality in the amount desired and at the minimum cost. These are obviously conflicting goals, as to increase the quality and quantity of energy to provide to customers will necessarily increase the cost of investment in networks as well as the operation cost. The task of planers and operators is to find the adequate balance, taking into account the uncertainties of future conditions.

Power systems reliability assessment can be performed considering two main systems aspects: adequacy and security [4]. The system adequacy, which is mainly used in power system planning, is an indicator of sufficient system facilities to satisfy future consumer demand or system operational constraints. The system security, which may be used in both power system planning and operation, is a measure of the system's ability to respond to dynamic transient disturbances arising within the system [4].

The services known as ancillary services may be used to improve the security and reliability. These services include active power AS (load/frequency control (LFC), including primary control, automatic generation control (AGC), tertiary control, balancing service and black start provision) and reactive power AS (voltage/reactive power control) [5-7].

Considerable efforts have been devoted to generation, transmission, and distribution systems assessment in past decades. An important theme in this subject is the study of the effects of weather conditions on power line outages [1, 8-13]. Statistic data indicate that about 60% of transmission line outages are caused by adverse weather or environment [2].The outage frequency and probability of overhead power lines increase dramatically when they are exposed to adverse weather conditions.

Traditionally, performance of power systems is evaluated using deterministic methods. The most popular method is known as N-1 criterion [4], which expresses the capacity of the transmission power system to lose one component without resulting in a failure caused by an overload elsewhere in the system. Deterministic criteria have achieved reasonable success, but they may lead to quite expensive plans, if fully applied. In practice the real power systems cannot fulfill the N-1 criterion, especially at developing countries or in radial topologies [14]. Then, there is a clear gap between the performance of the planned and the existing systems [4].

To overcome some deficiencies of deterministic methods, probabilistic criteria may also used [4]. Probabilistic methods are now being more widely used in power systems operation and planning to deal with a variety of uncertainties. The most basic feature of probabilistic reliability evaluation is the modeling of stochastic factors in power systems, including random outages of system components and uncertain variation of loads. Combinations of likelihoods and consequences of random outage events create the indices that represent the systems risk [15].

Actually, there are two types of uncertainties in power systems: randomness and fuzziness [15].

It has been recognized that failure frequencies or probabilities of transmission overhead lines are related to weather conditions [3, 13]. Weather conditions are often described in fuzzy words. Each weather condition (rain, wind, storm, etc.) can be categorized into different degrees (such as heavy, medium or light rain) [15]. This classification is obviously vague or fuzzy. The failure frequencies or probabilities of transmission lines are also impacted by environments (such as tree falling or animal activities) and operational conditions (such as load levels). It is extremely difficult to precisely distinguish effects of these conditions on the outage data of individual components using a probability model since there is no or little statistics available. Some utilities do not have sufficient statistical records but may have a good judgment on the range of outage parameters (such as repair time). For all of these cases, a fuzzy approach allows to obtain adequate models [15].

The reliability criteria can be deterministic and or probabilistic. In both cases a consistent data base and an exhaustive statistical analysis of all the available information such as failure rate (λ) and the average repair times (r) of each power systems component are needed. On the other hand, maximizing reliability in power systems implies minimization of unserved energy and therefore of load curtailment, avoiding an important monetary lost by undelivered energy, economy damage and an inconvenient to the power systems users.

A way to reduce the occurrence probability of the system states in transmission power systems that cause load curtailment becomes necessary and extremely important. Thus, this thesis proposes a new methodology that deals with this concern. The proposed method is based on statistical failure and repair data of the transmission power system components and uses fuzzy-probabilistic modeling for system component outage parameters. Using statistical records allows developing the fuzzy membership functions of system component outage parameters. To catch both randomness and fuzziness of component outage parameters, a hybrid method of fuzzy set and Monte Carlo simulation based on the fuzzy-probabilistic models is proposed. Once obtained the system states, a network contingency analysis to identify any overloading or voltage violation in the network is performed. This is followed by a remedial action algorithm, based on Optimal Power Flow, to reschedule generations and alleviate constraint violations and, at the same time, to avoid any load curtailment, if possible, or, otherwise, to minimize the total load curtailment, for the states identified by the contingency analysis. For the system states that cause load curtailment, an optimization approach is applied to reduce the probability of occurrence of the states that cause load curtailment in the transmission system while minimizing the costs to achieve that reduction.

To illustrate with detail the application of the proposed methodology a case study based on Reliability Test System (RTS) 1996 IEEE 24 Bus is presented.

The proposed methodology that joins in the same architecture the Monte Carlo simulation, fuzzy logic and mathematic programming for optimization is a key contribution of this thesis. This method resulted in the implementation of an innovative tool to reduce the occurrence probability of the system states in transmission power systems that cause load curtailment while minimizing the total costs to achieves that reduction. This methodology is of most importance for a decision-support tool to support the transmission system operator in the identification of critical components and in the planning of future investments in the transmission power system.

1.2 Objectives

This work proposes a new methodology to reduce the occurrence probability of the system states in transmission power systems that cause load curtailment. The methodology combines Monte Carlo simulation, fuzzy set theory and mathematical programming optimization techniques in order to act on repair time and failure rate (reduction of repair time and/or failure rate). The objectives are:

- ✓ Consistent data base creation and an exhaustive statistical analysis of all available information. Repair times, number of repairs, number of failures, number of repairable failures, time period analysis, the necessary cost to change the failure rate of components and the necessary cost to change the repair time of components are the necessary information;
- ✓ Fuzzy-probabilistic model creation for the components parameters of the transmission power system (repair times, failure rates, unavailability);
- ✓ Obtain the sample of systems states by Monte Carlo simulation;

- ✓ Propose a methodology to reduce the probability occurrence of the system states in transmission power systems that cause load curtailment acting in repair time and failure rate, with the objective of minimizing the cost of those actions.

1.3 Outline of the thesis

This thesis is composed by six chapters, including introduction and conclusions, and ten annexes.

Chapter 2 presents the reliability subject in a briefly way, depicting the reliability definition as well as the general concepts. The classification of operating system states, a comparison between probabilistic assessment and deterministic assessment, cost of reliability and it required data are topics addressed in this chapter.

Chapter 3 presents a detailed description of the outage parameters estimation. The parameters are the input data in risk evaluation and can be estimated from historical failure statistics. This chapter includes the explanation for the estimation point of mean and failure data variance, for the interval estimation of failure data mean and variance and for the estimation failure rate of individual components.

Chapter 4 is the core of this thesis. It presents a complete description of the **F**uzzy **M**onte **C**arlo methodology for **T**ransmission **Rel**iability based studies (FMC-TRel methodology) that will propose a way to reduce the occurrence probability of the systems states in transmission powers systems that cause load curtailment. FMC-TRel includes six main models, which are:

- ✓ Historical data;
- ✓ Fuzzy logic membership functions (repair time, failure rate and unavailability);
- ✓ Monte Carlo simulation;
- ✓ Contingency analysis;
- ✓ Remedial actions;
- ✓ Optimization concerning the investment for probability reduction for states that cause load curtailment.

This chapter is complemented with several examples for better explanation of the models that compose the methodology.

Chapter 5 is dedicated to a case study. The methodology is applied to the Reliability Test System (RTS) 1996 IEEE 24 BUS [16]. The chapter begins with the data presentation of the network, followed by the fuzzy models creation for the system components (cables, lines, transformers and generators) and the Monte Carlo simulation to create a sample of system states. A system contingency analysis is performed in order to identify if there is any overloading or voltage violation in the network for all system states obtained by Monte Carlo simulation. Next, for the all identified states that causes overloading or a voltage violation a remedial action algorithm is used in order to reschedule generations and alleviating constraint violations and at same time minimizing the total load curtailment. At last, the algorithm created to reduce the probability occurrence of the states that causes load curtailment while minimizing the costs to achieve that reduction is used.

Chapter 6 presents the most relevant conclusions of the undertaken work as well as some ideas for its future development. This thesis opens excellent opportunities to continue the research in reliability topics. Some of the potential ideas are already being worked by the author and are presented in this chapter as future and present research directions.

2 Power System Reliability

The highly demand environment and efficiency goals force utilities to plan and operate their systems closer to the limit. The stressed operation conditions have led to deterioration in system reliability. In recent years considerable power system outage events happened across the world. For example, the severe blackout in the east of North America on 14 August 2003 affected eight states in the US and two provinces in Canada, resulting in 50 million people being in darkness [17, 18]. On 4 November 2006, a large blackout occurred in Europe, leading to a split of the European Union for the Coordination of Transmission of Electricity (UCTE) interconnected system into three islands with different frequencies. This incident resulted in a total load curtailment of 14,540MW across nine countries [18, 19].

These severe power outages let us realize that the single-contingency criterion (N-1 principle) that has been used for many years in the power industry may not be sufficient to preserve a reasonable system reliability level. However, it is also commonly accepted that no utility can financially justify the N-2 or N-3 principle in power system planning. Obviously, one alternative is to bring risk management into the practice in planning, design, operation and maintenance, keeping system risk within an acceptable range. Power industry costumers have become more and more well-informed about electric power systems. They understand that it is impossible to expect almost one hundred percent continuity in power supply without any risk of outages [20].

According to an Electric Power Research Institute (EPRI) report [21], based on a national survey in all business sectors, the US economy alone is losing between $104 and $164 billion a year due to power system outages. These facts have brought ever-increasing concerns in power systems reliability, particularly in what concerns operation reliability.

In the past 30 years considerable efforts have been devoted to reliability evaluation of power systems but with limited research work in probabilistic reliability assessment [3, 18, 20, 22-29]. There are some similarities in probabilistic reliability evaluation for system planning and for system operation. For example, multiple component outage events must be assessed, including consequences of events and their probabilities of occurrence in both evaluations. However, fundamental differences exist between them. These differences are summarized bellow [18]:

- ✓ System planning is normally associated with system reinforcement in a long time span ranging from several years to more than 10 years, whereas system operations are associated with operational measures in a short term. In other words, system operations are based on existing system equipment and try to avoid the system enhancement;
- ✓ Reliability assessment for system planning evaluates the average performance of the system for a long time; the considered states are determined by system configurations, load levels and component availability. For specific operational states the dynamic and transient processes were usually not simulated in the system planning reliability assessment. However, reliability assessment for system operation, particularly for real-time operation, requires the system dynamics to be considered;
- ✓ Operational actions, including operational measures and remedial actions (such a load transfers, generation pattern changes, switching actions, temporary reconfigurations, protection/control schemes, etc), are generally not considered in reliability assessment for system planning, whereas these measures and actions have to be modeled in the reliability assessment for system operations.

2.1 Definition of power systems reliability

The function of an electric power system is to satisfy the system load requirement with reasonable assurance of service and quality. The reliability is the degree of performance of the elements of the electric power system that result in electricity being delivered to customers within accepted standards and in the desired amount. Reliability may be measured by the frequency, duration and magnitude of adverse effects on the electric supply [30]. Electric system reliability can be addressed by considering two basic and functional aspects of the electric system: adequacy and security. The diagram of figure 2.1 illustrates these two basic aspects of power systems.

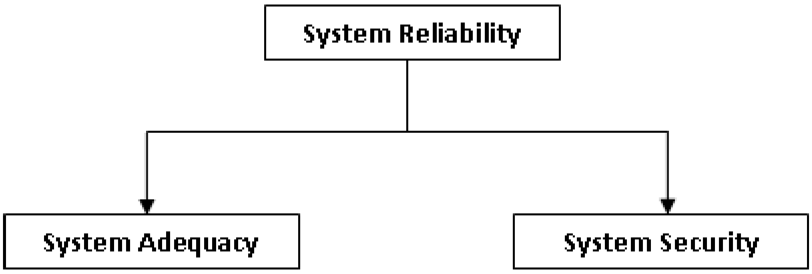


Fig. 2.1 – System reliability [22]

Adequacy is the ability of the electric system to supply the aggregated electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements. Security is the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

It should be pointed out that most of the risk evaluation techniques that have been used in the present applications of utilities are in the domain of adequacy assessment. Several ideas for security assessment have been addressed recently. However, the practical application in this area is limited. The fact is that most of the risk indices used in risk evaluation are inadequacy indices, not overall risk indices. The system indices that are based on historical outage statistics include the effect of both inadequacy and insecurity [20].

The risk evaluation for an overall system, including generation, transmission and distribution is impractical because such a system is too large to handle in terms of the existing computing capacity and accuracy requirements [20]. Moreover, the modeling and algorithms are quite different for the risk evaluation of a generation, transmission, substation and distribution system.

2.2 General concept of power system reliability

System reliability calculations can be more or less complex depending on the quantity of components that compose the system as well as the operation mode of the system and the importance that each component has in the system operation.

For simple systems, Markov equations and series network methods have been used in building the outage models of individual components. Other risk evaluation methods, such as the fault tree, minimum cut-set and event tree, are also used in this kind of systems. The reader can found more about the methods used for simple systems in [20, 22-24, 31-35].

There are several analytical methods to calculate the reliability of systems with numerous components. Although it is difficult to directly apply those methods to a real system, they may be used to model a portion of the complex system.

Usually, more sophisticated methods for risk evaluation are required for complex systems: Monte Carlo simulation and State Enumeration [20]. The first one can be categorized into sequential and nonsequential sampling. The basic idea of the methods for a complex system is to perform risk evaluation using an iteration process [20]. In this thesis the studied method will be the Monte Carlo simulation. An explanation about State Enumeration can be found in [20].

Power Systems are composed by a very large number of components that can be suffering damage situations. When in a fault condition, the component does not perform the functions for which it was built. This may be reflected in the performance of the system where these components are integrated.

The main objectives for the reliability studies are:

- ✓ Identifying the system risk areas;
- ✓ Comparing alternative expansion schemes or reinforcement;
- ✓ Analyzing the costs of reinforcements and interruptions;

- ✓ Comparing alternative schemes for system operation and maintenance.

It is not always easy to conduct such studies, mainly due to reasons related to the following:

- ✓ Lack of data;
- ✓ Complex problems that require large computational power;
- ✓ The need to use probabilistic techniques;
- ✓ Lack of knowledge in the domain of techniques for power systems reliability calculation.

A historical data of the system is needed to calculate the system reliability, in order to obtain information like repair time, number of failures, number of repairable failures, etc. If this information does not exist, it is possible to use the information of similar systems.

2.2.1 Reliability of a component

The failure rate is often used in reliability studies. The failure rate of a component in time $\boldsymbol{t}$ is defined as the probability of component malfunction in time interval $[\boldsymbol{t}, \boldsymbol{t}+\boldsymbol{dt}]$ divided by $\boldsymbol{dt}$, i.e.:

$$\boldsymbol{\lambda(t)} = \frac{\lim\limits_{dt\to 0} \dfrac{N_f(t+dt) - N_f(t)}{dt}}{N_w(t)}$$

$$\boldsymbol{\lambda(t)} = \frac{\dfrac{dN_a(t)}{dt}}{N_w(t)} = \frac{1}{N_w(t)} \times \frac{dN_a(t)}{dt} \qquad (2.1)$$

where:

$\boldsymbol{N_f(t)}$ represents the number of components that fails until the time $\boldsymbol{t}$

$\boldsymbol{N_w(t)}$ represents the number of components that work properly until the time $\boldsymbol{t}$

Usually, the failure rate is not constant throughout the component life time. Figure 2.2 shows the typical evolution of $\boldsymbol{\lambda}$ with $\boldsymbol{t}$.

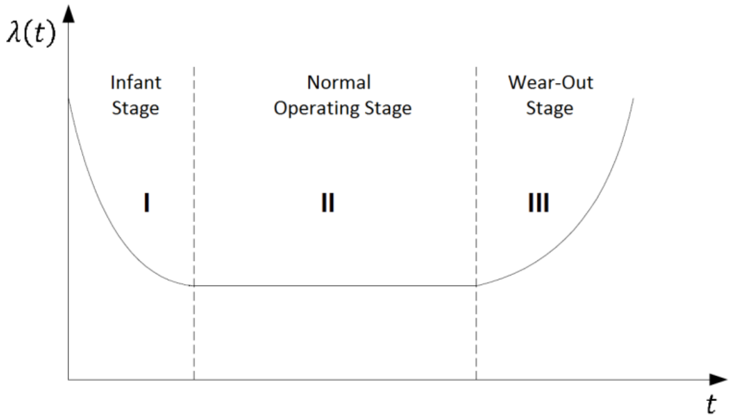


Fig. 2.2 – Basin curve of a component's life [20, 36]

Generally, it is considered that the component is in the Normal Operating Stage (Zone II in figure 2.2) and therefore has a constant failure rate.

The reliability of a component, $\boldsymbol{R(t)}$, in time $\boldsymbol{t}$, is given by:

$$\boldsymbol{R(t) = \frac{N_w(t)}{N} = 1 - \frac{N_f(t)}{N}} \tag{2.2}$$

Moreover, $\boldsymbol{N = N_w(t) + N_f(t)}$ and from the previous equations we have:

$$\boldsymbol{\frac{dR(t)}{dt} = -\frac{1}{N} \times \frac{dN_f(t)}{dt}} \tag{2.3}$$

Substituting equations 2.2 and 2.3 into equation 2.1 we have:

$$\boldsymbol{\lambda(t) = -\frac{1}{R(t)} \times dR(t)} \tag{2.4}$$

By integrating and considering $\boldsymbol{\lambda(t)}$ constant, we obtain the equation 2.5 for the reliability of a component:

$$\boldsymbol{R(t) = e^{-\lambda \cdot t}} \tag{2.5}$$

The unavailability, which is known as the component failure probability up to time $\boldsymbol{t}$ is given by equation 2.6

$$\boldsymbol{Q(t) = 1 - e^{-\lambda \cdot t} = 1 - R(t)} \tag{2.6}$$

The reliability and unavailability equations can be simplified in some cases. Thus, if we develop equation 2.6, using infinity series, we have:

$$\boldsymbol{Q(t) = 1 - e^{-\lambda \cdot t}}$$

$$\boldsymbol{Q(t) = 1 - \left[1 - \lambda \cdot t + \frac{(-\lambda \cdot t)^2}{2!} + \frac{(-\lambda \cdot t)^3}{3!} + \cdots\right]} \tag{2.7}$$

$$\boldsymbol{Q(t) = \lambda \cdot t - \frac{(-\lambda \cdot t)^2}{2!} - \frac{(-\lambda \cdot t)^3}{3!} - \cdots}$$

If $\boldsymbol{\lambda \cdot t \ll 1}$ the equations 2.5 and 2.6 turn into equations 2.8 and 2.9, respectively:

$$\boldsymbol{R(t) \cong 1 - \lambda \cdot t} \tag{2.8}$$

$$\boldsymbol{Q(t) \cong \lambda \cdot t} \tag{2.9}$$

2.2.2 Repairable forced outages

A forced outage happens randomly and is totally out of man's control, but the majority of forced outages in power systems are repairable. However, a planned outage is not caused by a failure but is scheduled by personal in order to undertake a maintenance or replacement activity. Some outages that lie between these two categories may exist in the system. For instance, a cable with a serious oil leakage will not be forced to outage immediately but has to be taken out of service within a limited time period. This outage type is called semiforced or semiplanned [20].

A steady up-down-up cycle process can model the repairable forced failures. Figures 2.3a) and 2.3b) present, respectively, the cycle process and its state transition diagram.

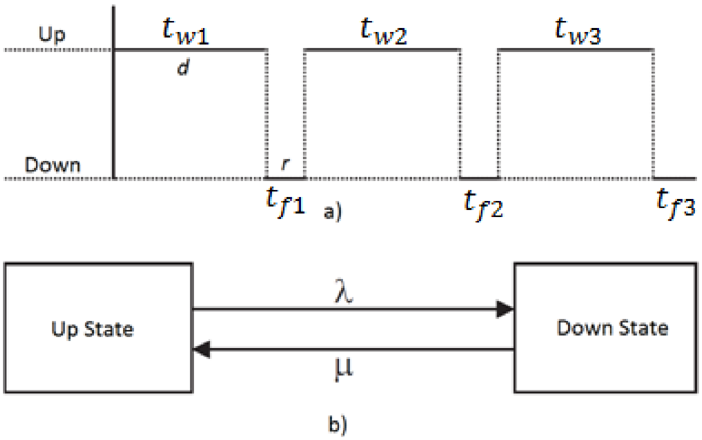


Fig. 2.3 – a) Up and down process of a repairable component b) State space diagram of a repairable component [20]

Mean time to failure (hours), mean time to repair (hours) and mean time between failures (hours) are defined by:

$$\boldsymbol{MTTF = d = \frac{\sum_{i=1}^{n_w} t_{wi}}{n_w} = \frac{1}{\lambda}} \tag{2.10}$$

$$\boldsymbol{MTTR = r = \frac{\sum_{i=1}^{n_f} t_{fi}}{n_f} = \frac{1}{\mu}} \tag{2.11}$$

$$\boldsymbol{MTBF = d + r} \tag{2.12}$$

where:

$\boldsymbol{\lambda}$ is the failure rate in failures per year, $\boldsymbol{\mu}$ is the repair rate in repairs per year, $\boldsymbol{t_{wi}}$ is the working time, $\boldsymbol{t_{fi}}$ is the failure time, $\boldsymbol{n_w}$ is the number of times that up state occurs and $\boldsymbol{n_f}$ is the number of times that down state occurs. Figure 2.4 presents a scheme for mean times to failure (MTTF), to repair (MTTR) and between failures (MTBF).

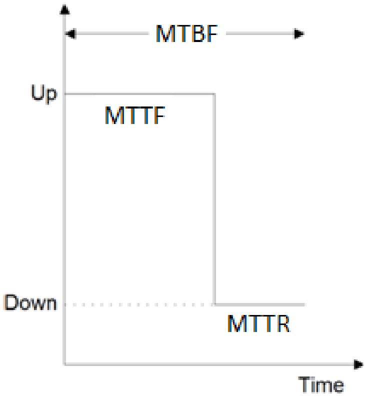


Fig. 2.4 – Mean times to failure, to repair and between failures [36]

The probability of a component being in the down state is given by:

$$\boldsymbol{P(f) = FOR = U = \frac{r}{d+r} = \frac{\lambda}{\lambda+\mu} = \frac{MTTR}{MTTF+MTTR}} \tag{2.13}$$

where:

$\boldsymbol{FOR}$ is the forced outage rate and $\boldsymbol{U}$ is the unavailability.

The probability of a component being in the up state is given by:

$$\boldsymbol{P(W) = \frac{d}{d+r} = \frac{MTTF}{MTTF+MTTR}} \tag{2.14}$$

2.3 System operating states classification

To determine adequacy and security, a power system can be divided into several operating states in terms of the degree to which adequacy and security conditions are satisfied. A possible operating states classification [18, 22, 37, 38] is shown in figure 2.5.

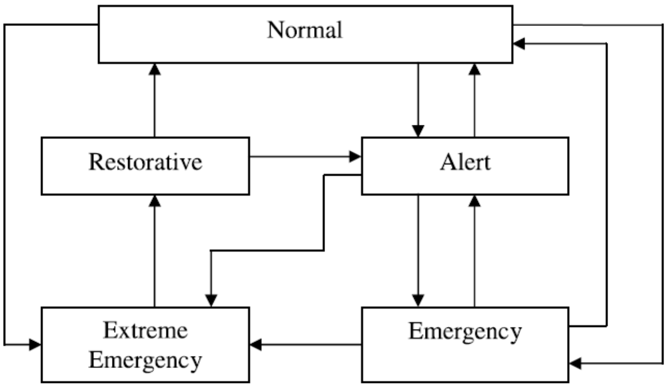


Fig. 2.5 – Classification of system operating states [18, 22]

In the normal state all limits (bus voltage limits, component ratings and other operating constraints) are satisfied. A disturbance like a loss of any system component or a sudden change of load generation will not result in a limit violation or system instability. The N-1 criterion is a popular deterministic rule for a single contingency used in a large number of utilities. A system state that still remains as a normal state after a disturbance or outage is called a healthy state. In a normal state the system is both adequate and secure before and after disturbances or outages.

In an alert state, all limits and constraints are still satisfied and the system is stable. The system can enter an alert state due to the outage of a component or to a change of generation, load or network configuration. In alert states the system is still adequate and secure before a disturbance or outage, but if an outage occurs in this state the system becomes inadequate or insecure, entering in an emergency or extreme emergency state. Adequate operational measures, such as generation re-dispatch, load transfer, network reconfiguration, can return the alert state to a normal state.

When in an alert state, the system can enter an emergency state if a disturbance (component outage, generator loss, load loss) occurs before operational measures can be taken. In this state no load is curtailed but equipment limits or operating constraints have been violated and the system may be in a critically stable state that will start to become instable.

If remedial correction measures to restore the system to the alert state or the normal state are not taken, the system will transfer from the emergency state to the extreme emergency state. The emergency state requires immediate remedial corrections, which may include control measures, special protection schemes, etc, which first objective is to remove violations without load curtailment. The remedial corrections could lead directly to the normal state or to the alert state, where further actions may be necessary to achieve the normal state.

In the extreme emergency state, load curtailment may be necessary; otherwise, cascading outages events happen or the system is split into islands or enters the process of losing its dynamic, transient or voltage stability. The extreme emergency state occurs due to the fact that either remedial actions could not be taken fast enough or that remedial actions are not sufficient.

2.4 Probabilistic assessment vs. deterministic assessment

In the current utilities practice, a deterministic approach is used for adequacy and security assessments in system operation. The deterministic approach is based on the assessment of a series of system cases that are specified by operators or operation planners. The N-1 contingency principle is used in most cases. This means that individual system components are removed one by one for the analysis. Several specific double-contingency events may be considered in some cases. The system must be in a normal state, i.e. no limit is violated and the system is stable with a pre-determined margin following any of pre-specified contingencies.

Three weaknesses can be pointed to the deterministic approach [18]:

1. Only consequences of contingences are evaluated, while probabilities of occurrence of contingencies are ignored. If the consequence of a selected contingency is not very severe, system risk could still be high if its probability is relatively large. On the other hand, if the probability of an outage event is extremely small, the contingency analysis of such event may result in a economically not viable operation;
2. Any of the uncertainty factors that exist in real world (such as random failures of system components, uncertainty of load variations, errors in real time information, uncertainty in the parameters or input data, volatility of power demand on the market, etc.) are not taken into account in the deterministic analysis. This can lead to results distant from reality;

3. The deterministic approach is based on pre-selected “worst-cases” but, in its practical implementation, the deterministic approach may not consider the real worst case.

The probabilistic assessment can combine consequences and probabilities together to create an index that truly represents the system risk. It can also take all uncertainty factors in consideration. All cases can be selected using flexible criteria that are based on either consequences, probabilities or a combination of both [18].

2.5 Reliability cost

Power systems include many components, including lines, cables, transformers, breakers, isolators, switches and a variety of reactive power source equipments. Component outages are the root cause of the system failure state [20] and are classified into two categories: independent and dependent. In most cases, only repairable forced outages are considered, whereas in some cases, planned outages are also modeled.

Due to the complex and integrated nature of a power system, failures in any part of the system can cause interruptions which range from disturbing a small number of local residents to a major and widespread catastrophic disruption of supply. The economic impact of these outages is not necessarily restricted to loss of revenue by the utility or loss of energy utilization by the customer. In order to estimate true costs, indirect costs imposed on customers, society and the environment due to the outage should also be considered [23].

In order to reduce the frequency and duration of the events that cause consumer disconnections, an increased investment during the planning phase, operation phase, or both must be made. However, overinvestment can lead to excessive operation costs which must be reflected in the tariff structure. Consequently, the economic constraints can be violated although the system may be very reliable. On the other hand, underinvestment leads to the opposite situation. It is, therefore, evident that the economic and reliability constraints are conflicting factors, and this can lead to difficult management decisions at both the planning and operation levels [23].

In the decision-making process it is evident that reliability and economics play a major integrated role. Figure 2.6 depicts the first step in this process which shows how the reliability of a product or system is related to the investment cost, i.e., increased investment is required in order to improve reliability. This figure clearly shows the general trend of increasing the incremental cost ΔC to achieve a given increase in reliability ΔR when the reliability level increases or, alternatively, a given increase in investment produces a decreasing increment in reliability as the reliability is increased. In either case, high reliability is expensive to achieve.

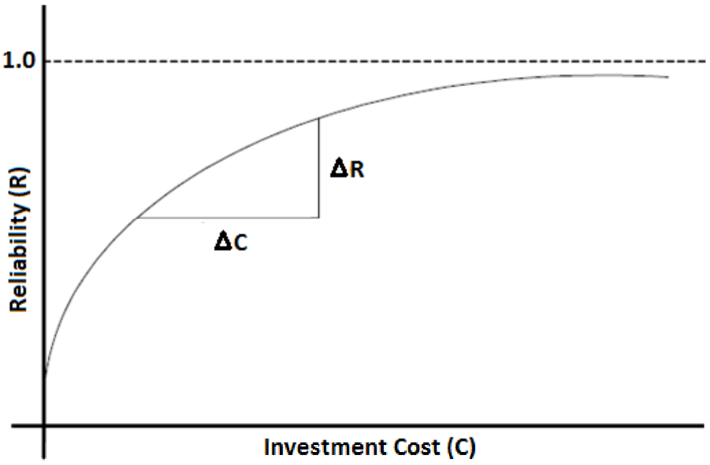


Fig. 2.6 – Incremental cost of reliability [23]

On one hand, the incremental cost of reliability, ΔC/ΔR, is one way of deciding whether an investment in the system is worth it. On the other hand, it does not sufficiently reflect the benefits seen by the utility, the customer or the society. It is more consistent comparing the reliability cost (the investment cost needed to achieve a certain level of reliability) with the reliability worth (the benefit derived by the customer and the society) [23]. The basic concept of reliability-cost and reliability-worth evaluation is relatively simple and can be presented by the cost-reliability curves of figure 2.7. These curves illustrate that the investment cost generally increases with higher reliability. However, the customer costs associated with failures decrease as the reliability increases. The total costs therefore are the summation of these two individual costs. The total cost exhibits a minimum for which an “optimum” or target level of reliability is achieved. Two difficulties arise in its assessment:

1. The calculated indices are usually derived only from approximate models;

2. There are significant problems in assessing customer perceptions of system failure costs.

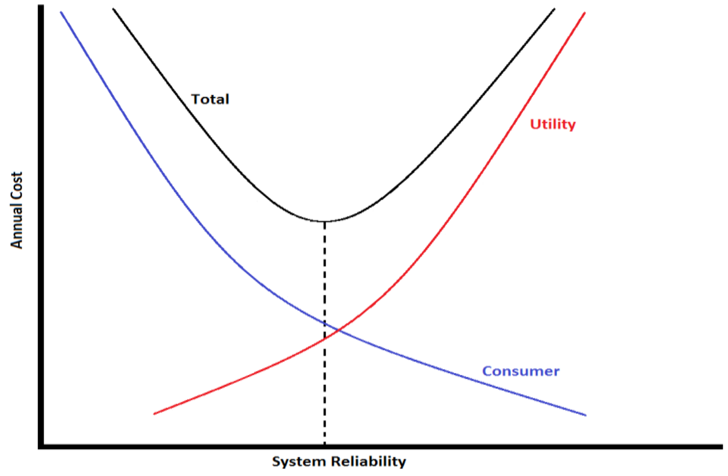


Fig. 2.7 – Total reliability costs [23]

2.6 Reliability data required

The parameters of component outage models are the reliability data required in power system risk evaluation. They are basically calculated from historical statistics, although an engineering judgment based on individual equipment assessments is also used in some special cases. Collecting suitable data is at least as essential as developing risk evaluation methods. The data must be sufficiently comprehensive to ensure that an evaluation method can be applied, but restrictive enough to ensure that unnecessary data are not collected. The quality of data is an important factor to consider in data collection. Outage statistics constitute a huge data pool and some bad or invalid records cannot be fully avoided in any data base. Data processing is necessary to filter out bad data. The volume of outages records will increase with the time and therefore the average failure frequency and repair time for a piece of equipment or an equipment group will change from year to year. The reliability database should have a means of continuous updating and should be flexible enough to output reports in a variety of formats [20].

2.7 Conclusions

This chapter addresses several aspects in the domain of power system reliability. System adequacy and system security are the two basic functional aspects that are related with power system reliability. Adequacy assessment is the most presently used reliability evaluation technique in the power system.

A reliability cost-worth approach is the most useful concept for planning purposes, where the main difficulty is the perceived uncertainty in the consumers' consumption.

Reliability data collection is an essential and important aspect of reliability assessment, where the updating reliability data is a long-term and continuous task.

3 Estimation of Outage Parameters

Parameters such as the failure frequency and repair time, failure rate and repair rate, transition rates between multiple states, unavailability or forced outage rate (FOR) and standard deviation will characterize each outage model. These parameters are the input data in risk evaluation and can be estimated from historical failure statistics.

For the repairable model of a single component only two parameters are needed and the others can be calculated from them. Most data collection systems provide the failure frequency or the unavailability and repair time. Usually, the failure rate and repair rate are not directly collected, but can be calculated from the failure frequency and repair time [20].

When an analytical method is used, a parameter in the outage model is the mean value based on historical statistics. In order to deal with the uncertainty in statistics, sensitivity studies must be performed. For this, it is necessary to have a confidence range of the estimated parameter. If Monte Carlo simulation (MCS) [39] is used, a probability distribution of the parameter is considered. So, it is necessary to estimate both the mean and standard deviation for the assumed continuous distribution of the parameter or its experimental discrete distribution [20].

3.1 Estimation point of mean and failure data variance

A parameter in the outage model is an average value of failure data. There are two average concepts: the sample data average and the average over a given time period. For example, the Mean Time To Repair (MTTR) is the average of historical repair times of a single or multiple components and the failure frequency when calculated based on multiple components can be the average of the failure frequencies of all individual components. On the other hand, the failure frequency of a single component is the average of failures over a given period [20].

3.1.1 Sample mean and sample variance

The sample mean is a popular estimation for the sample data average. The arithmetic average of sample data expressed in equation 3.1 is an unbiased estimate of the mean value [20].

$$\boldsymbol{\bar{X}} = \frac{\mathbf{1}}{\boldsymbol{n}}\sum_{\boldsymbol{i}=\mathbf{1}}^{\boldsymbol{n}} \boldsymbol{X_i} \tag{3.1}$$

where $\boldsymbol{\bar{X}}$ is the mean, $\boldsymbol{X_i}$ is a sample and $\boldsymbol{n}$ is the number of samples.

The variance is an indicator of the dispersion degree of a random variable. The standard deviation is the square root of the variance. In general, the population variance of a uniformly distributed finite population of size $\boldsymbol{n}$ is given by equation 3.2.

$$\boldsymbol{\sigma^2} = \frac{\mathbf{1}}{\boldsymbol{n}}\sum_{\boldsymbol{i}=\mathbf{1}}^{\boldsymbol{n}} (\boldsymbol{X_i} - \boldsymbol{\bar{X}})^{\mathbf{2}} \tag{3.2}$$

In many practical situations, the true variance of a population is not *a priori* known. When dealing with a infinite populations, this is generally impossible. A common task is to estimate the variance of a population from a sample. We take a sample with $\boldsymbol{n}$ values $\boldsymbol{X_1}, \ldots, \boldsymbol{X_n}$ from the population, and estimate the variance on the basis of this sample [40].

It is also known that in data processing the sample variance of failure data is often to replace the population variance [20]. Equation 3.3 is referred to as sample variance.

$$\boldsymbol{s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2} \tag{3.3}$$

where $\boldsymbol{\bar{X}}$, $\boldsymbol{X_i}$ and $\boldsymbol{n}$ are the same as defined for equation 3.1.

3.2 Interval estimation for failure data mean and variance

Sub-section 3.1 described two methods which are used to estimate a single value of mean or variance which are called point estimation methods. However, it cannot be expected that a point hits exactly the parameter on its true value, being desirable to have a confidence interval to cover the uncertainty of statistics. The confidence interval contains the parameter to be estimated with a specified probability that is called the degree of confidence. The confidence interval is very useful for sensitivity studies in system risk evaluation [20].

3.2.1 General concept of confidence interval

It is important to know that the sample mean $\mathbf{\bar{X}}$ is not exactly the same as the real mean $\boldsymbol{\mu}$ of the whole population. As an example, a normal population $\mathbf{N(X;\ \boldsymbol{\mu}, 1)}$ with unknown mean $\boldsymbol{\mu}$ and variance equal to 1 are taken [20, 41, 42]. From the standard normal distribution, it is known that:

$$\boldsymbol{\frac{1}{\sqrt{2\pi}}\int_{-1.96}^{1.96} e^{-\left(\frac{y^2}{2}\right)}\,dy = 0.95} \tag{3.4}$$

This implies that

$$\boldsymbol{p\big(-1.96 \le (\bar{X} - \mu)\sqrt{n} \le 1.96\big) = 0.95} \tag{3.5}$$

or

$$\boldsymbol{p\left(\bar{X} - \frac{1.96}{\sqrt{n}} \le \mu \le \bar{X} + \frac{1.96}{\sqrt{n}}\right) = 0.95} \tag{3.6}$$

where $\boldsymbol{\bar{X}}$ is the sample mean of the normal population and $\boldsymbol{n}$ is the number of sample data.

The random interval $\left(\bar{X}-\frac{1.96}{\sqrt{n}},\bar{X}+\frac{1.96}{\sqrt{n}}\right)$ contains the unknown mean μ with probability of 0.95.

Let us assume that the distribution of a population variable X has an unknown parameter θ and we can build two functions of the variable's random sample sequence $\{X_i, i=1,\dots,n\}$: θ_1^* and θ_2^*, with $\theta_1^* \leq \theta_2^*$ where θ_1^* and θ_2^* is the confidence interval of the parameter θ. If the equation 3.7 holds for a given α with $0 \leq \alpha \leq 1.0$

$$p(\theta_1^* \leq \theta \leq \theta_2^*) = 1-\alpha \tag{3.7}$$

The quantity $1-\alpha$ is called the confidence degree and α is called the significant level, which is typically specified to be equal to or smaller than 0.05.

The confidence degree is the probability that a random confidence interval contains the unknown parameter rather than the probability that the random parameter falls in a fixed interval, i.e., the confidence interval is varied depending on the sample size and how to build the two bound functions [20].

3.2.2 Confidence interval of mean

The two theorems in statistics theory bellow [20, 41] enable the possibility to estimate a confidence interval of the mean.

First Theorem

$(\bar{X}-\mu)\frac{\sqrt{n}}{s}$ follows a t-distribution with $n-1$ degrees of freedom. If $\bar{X}$ and s are the sample mean and sample standard deviation, respectively, of a random sample of size n from the normal population $N(X;\mu,\sigma^2)$.

Through the first theorem, for the given significant level α, it can be stated that the random variable $(\bar{X}-\mu)\frac{\sqrt{n}}{s}$ is between $-t_{\alpha/2}(n-1)$ and $t_{\alpha/2}(n-1)$ with probability $n-1$, where $t_{\alpha/2}(n-1)$ is such a value that the integral of the t-distribution density function with $(n-1)$ degrees of freedom from $t_{\alpha/2}(n-1)$ to ∞ equals $\alpha/2$. Figure 3.1 illustrates this concept. Then we have:

$$-t_{\alpha/2}(n-1) \leq \frac{(\overline{X}-\mu)}{s/\sqrt{n}} \leq t_{\alpha/2}(n-1) \tag{3.8}$$

$$\overline{X} - t_{\alpha/2}(n-1)\frac{s}{\sqrt{n}} \leq \mu \leq \overline{X} + t_{\alpha/2}(n-1)\frac{s}{\sqrt{n}} \tag{3.9}$$

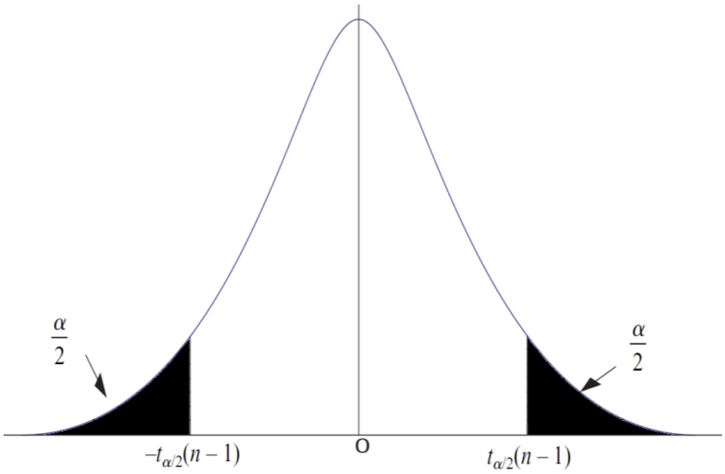


Fig. 3.1 – Confidence interval of the mean using *t*-distribution [20]

In theory, this confidence interval of μ can be used only for the normal population.

It is a general practice to assume that failure data follow the normal distribution. Following the second theorem, an approximate confidence interval estimate of μ for a relatively large sample size from nonnormal distributions can also be obtained [20].

Second Theorem

The sampling distribution of $\overline{X}$ is the normal distribution $N\left(X;\mu,\frac{\sigma^2}{n}\right)$ if $\overline{X}$ is the sample mean of a random sample of size n from the normal population $N(X;\mu,\sigma^2)$.

Once a random variable X does not follow a normal distribution, its sample mean $\overline{X}$ generally does not follow a normal distribution. On the other hand, for a large sample any variable X approximately follows a normal distribution according to the Central Limit Theorem [43]. As a result, from the second theorem, the sample mean $\overline{X}$ approximately follows the normal distribution $N\left(X;\mu,\frac{\sigma^2}{n}\right)$. Moreover, the sample variance s^2 is a consistent estimate of the population variance σ^2. Substituting the sample standard deviation $\boldsymbol{s}$ for $\boldsymbol{\sigma}$, it can be stated that the random variable $(\overline{\boldsymbol{X}}-\boldsymbol{\mu})\frac{\sqrt{\boldsymbol{n}}}{\boldsymbol{s}}$ is between $-\boldsymbol{Z}_{\alpha/2}$ and $\boldsymbol{Z}_{\alpha/2}$ with probability of $\mathbf{1}-\boldsymbol{\alpha}$, where $\boldsymbol{Z}_{\alpha/2}$ is such a value that the integral of the standard normal density function from $\boldsymbol{Z}_{\alpha/2}$ to ∞ equals $\boldsymbol{\alpha}/\mathbf{2}$ [20]. Figure 3.2 illustrate this concept. Then we have:

$$-\boldsymbol{Z}_{\alpha/2} \leq \frac{(\overline{\boldsymbol{X}}-\boldsymbol{\mu})}{\frac{\boldsymbol{s}}{\sqrt{\boldsymbol{n}}}} \leq \boldsymbol{Z}_{\alpha/2} \tag{3.10}$$

$$\overline{\boldsymbol{X}}-\boldsymbol{Z}_{\alpha/2}\frac{\boldsymbol{s}}{\sqrt{\boldsymbol{n}}} \leq \boldsymbol{\mu} \leq \overline{\boldsymbol{X}}+\boldsymbol{Z}_{\alpha/2}\frac{\boldsymbol{s}}{\sqrt{\boldsymbol{n}}} \tag{3.11}$$

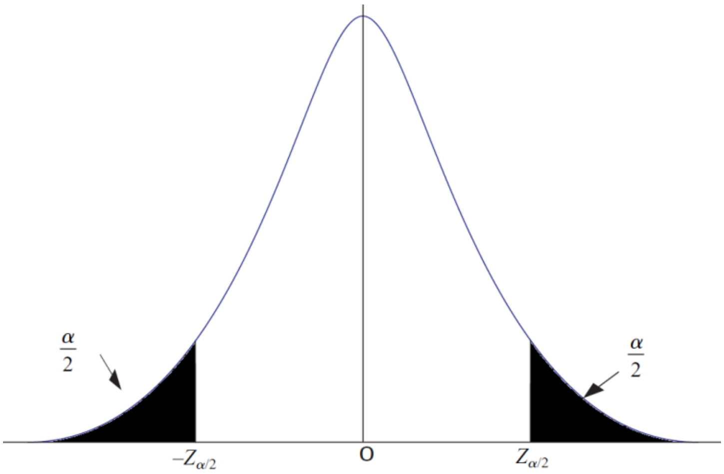


Fig. 3.2 – Confidence interval of mean using normal distribution [20]

Usually, equation 3.9 is used for a relatively small number of samples, whereas equation 3.11 is used for a relatively large number of samples [20].

3.2.3 Confidence interval of variance

A third theorem provides the theoretical basis for estimation of the confidence interval of variance [20, 41].

Third Theorem

$(\boldsymbol{n}-\mathbf{1})\frac{\boldsymbol{s}^2}{\boldsymbol{\sigma}^2}$ follows the chi-square distribution with $\boldsymbol{n}-\mathbf{1}$ degrees of freedom if $\boldsymbol{s}^2$ is the sample variance of a random sample of size $\boldsymbol{n}$ from the normal population $\boldsymbol{N}(\boldsymbol{X};\boldsymbol{\mu},\boldsymbol{\sigma}^2)$.

From the third theorem, for the given significance level $\boldsymbol{\alpha}$ it can be stated that the random variable $(\boldsymbol{n}-\mathbf{1})\frac{s^2}{\sigma^2}$ is between $\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1})$ and $\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1})$ with probability $\mathbf{1}-\boldsymbol{\alpha}$, where $\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1})$ is such a value that the integral of χ^2 distribution density function from $\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1})$ to ∞ equals $\alpha/\mathbf{2}$. This concept is depicted in figure 3.3. So we have:

$$\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1}) \le \frac{(\boldsymbol{n}-\mathbf{1})\boldsymbol{s}^2}{\boldsymbol{\sigma}^2} \le \chi^2_{\alpha/2}(\boldsymbol{n}-\mathbf{1}) \tag{3.12}$$

$$\frac{(\boldsymbol{n}-\mathbf{1})\boldsymbol{s}^2}{\chi^2_{\alpha/2}(\boldsymbol{n}-\mathbf{1})} \le \boldsymbol{\sigma}^2 \le \frac{(\boldsymbol{n}-\mathbf{1})\boldsymbol{s}^2}{\chi^2_{1-\alpha/2}(\boldsymbol{n}-\mathbf{1})} \tag{3.13}$$

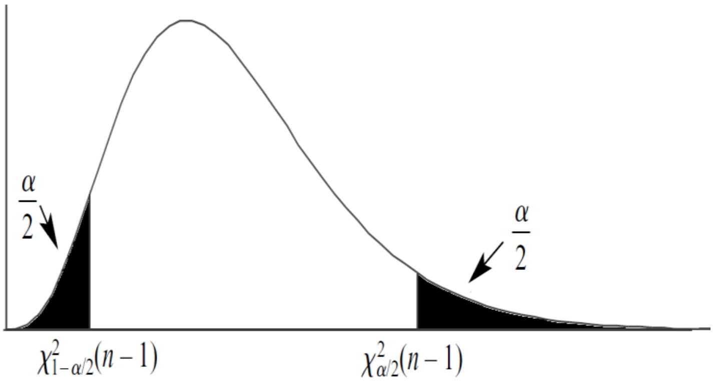


Fig. 3.3 – Confidence interval of variance using χ^2 distribution [20]

3.3 Estimation failure rate/frequency of individual components

Most data collection systems provide failure frequencies rather than failure rates.

The sample mean method discussed above can be used to estimate the total average failure frequency based on the failure frequencies of multiple components but cannot be applied to the estimation of failure frequency for a single component [20].

3.3.1 Point estimation

For an individual component the failure frequency is estimated as average failures per year over a time period:

$$\boldsymbol{f} = \frac{\boldsymbol{R_f}}{\boldsymbol{T}} \tag{3.14}$$

where $\boldsymbol{R_f}$ is the number of component repairable failures in time period $\boldsymbol{T}$ (in years). For transmission lines (cables or overhead lines), the average failure frequency of several lines should not be calculated using the sum of their individual failure frequency divided by the number of lines. In fact, even if the lines are classified as being of the same type and have the same voltage, there are particular characteristics for each line (e.g. their lengths are usually different, the areas where they are installed may not be similar, each line may have a specific problem) that should be taken into account. Usually the failure frequencies of all the lines are normalized using the lines lengths as shown in equation 3.15 [20]:

$$\boldsymbol{f_i} = \frac{\boldsymbol{L_i} \sum_{i=1}^{m} \frac{\boldsymbol{R_{fi}}}{\boldsymbol{T_i}}}{\sum_{i=1}^{m} \boldsymbol{L_i}} \tag{3.15}$$

where $\boldsymbol{f_i}$ is the estimated failure frequency of the $\boldsymbol{ith}$ line, $\boldsymbol{L_i}$ the length (in km) of the $\boldsymbol{ith}$ line, $\boldsymbol{m}$ the number of lines and $\boldsymbol{R_{fi}}$ the number of failures of the $\boldsymbol{ith}$ line in the time period $\boldsymbol{T_i}$.Therefore, if the forced failure frequency is calculated, $\boldsymbol{T_i}$ changes for different lines since the time due to their nonforced outages, which needs to be excluded from the total elapsed time, is usually different.

If one single line is considered the equation 3.15 is the same as equation 3.14. It should be stressed that it has been implicitly assumed in equation 3.15 that the failure frequency of lines is proportional to the length. Otherwise, instead of using the total average, the individual failure frequency of each line should be used [20].

3.3.2 Interval estimation

It is quite difficult to develop a theoretical accurate method for the failure frequency interval estimation. Luckily, statistics theory enables us to estimate the confidence interval of the failure rate, which can be approximately considered as an interval estimate of failure frequency, as they are numerically close in most cases [20].

The following relationship between the Chi-Square distribution (χ^2) and the Poisson distribution exists in the failure data processing:

$$\boldsymbol{\chi^2(2\cdot F) = 2\cdot\lambda\cdot T} \tag{3.16}$$

where **λ** is the average failure rate, **T** is the total time length considered and **F** is the statistical number of failures within the time **T** in data samples. The equation 3.16 indicates that the quantity of two times the expected number of failures in the time $\boldsymbol{T}$ follows the $\boldsymbol{\chi^2}$ distribution with $(\boldsymbol{2\cdot F})$ degrees of freedom. Hence, for the given significant level $\boldsymbol{\alpha}$, it can be stated that failure rate $\boldsymbol{\lambda}$ falls into the random confidence interval 3.17 with the probability of $\boldsymbol{1-\alpha}$ [20]:

$$\frac{\chi^2_{1-\alpha/2}(\boldsymbol{2\cdot F})}{\boldsymbol{2\cdot T}} \le \boldsymbol{\lambda} \le \frac{\chi^2_{\alpha/2}(\boldsymbol{2\cdot F})}{\boldsymbol{2\cdot T}} \tag{3.17}$$

3.4 Conclusions

The methods to estimate the outage parameters for transmission power system reliability calculation have been discussed in this chapter. These concepts are fundamental for the methodology proposed in chapter four.

The parameters of component outage models can be the failure frequency, repair time, failure and repair rates, unavailability, mean life and its standard deviation. They are estimated from historical failure records and they are the input data for the power system risk assessment. It is very important to note that data quality is the key in risk evaluation. As we know, the uncertainties as well as errors in historical statistics are inevitable. Reducing the impacts of the uncertainties or errors and enhancing the accuracy are of essential importance in the parameters estimation.

The point, interval and distribution estimations are the three levels for the parameters estimation. Point estimation results in a single value for each parameter, which corresponds to the sample mean. In power system risk assessment the average parameter has been widely used for its simplicity in application, although there is uncertainty about it.

A confidence range of a parameter is created by the interval estimation, which is extremely useful in sensitivity analysis. This is very important to support the analysis of the impacts of input data uncertainties on the results of system risk assessment.

There are different interval estimation approaches and they may produce slightly different confidence ranges.

The probability distribution of a parameter is given by distribution estimation. Using the probability distribution of input data, a significant enhancement in the accuracy of system risk assessment can be obtained. Consequently, higher requirements and more calculation efforts for assessment techniques are needed.

4 Fuzzy Monte-Carlo Methodology for Transmission Reliability Based Studies

Transmission power systems should be virtually free of faults but consequently infinite investments would be necessary. This is obviously impossible in the real world, so it is necessary to establish a compromise between reliability and economy. Faults are acceptable as long as their consequences are accepted by users and customers. Acceptance levels are quantitatively defined by reliability criteria, which may be deterministic and/or probabilistic. In both cases a consistent data base and an exhaustive statistical analysis of all the available information such as failure frequency or failure rate (λ) and average repair time (r) of each transmission power system component (including overhead lines, cables, transformers and generators) are needed. On the other hand, maximizing reliability in transmission power systems implies minimization of unserved energy as well as load curtailment, avoiding an important monetary lost due to undelivered energy, economy damage and inconvenience to the transmission power systems users.

This thesis proposes a new methodology to deal with reliability based decision making in transmission power systems. The proposed method is based on statistical failure and repair data of the transmission power system components and uses fuzzy-probabilistic modeling for system component outage parameters. The fuzzy membership functions of system component outage parameters are developed using statistical records. Based on the fuzzy-probabilistic models, a hybrid method of fuzzy set (FS) and Monte Carlo simulation (MCS) is proposed to catch both randomness and fuzziness of component outage parameters. With the system states, a network contingency analysis to identify any overloading or voltage violation in the network is performed. This is followed by a remedial action algorithm, based on Optimal Power Flow, to reschedule generations and alleviate constraint violations and, at the same time, to avoid any load curtailment, if possible, or, otherwise, to minimize the total load curtailment, for the states identified by the contingency analysis. For the system states that cause load curtailment, a mathematical model to reduce the probability of occurrence of the states that cause load curtailment in the transmission system while minimizing the costs to achieve that reduction is applied.

Figure 4.1 presents the basic idea of the proposed **F**uzzy **M**onte **C**arlo methodology for **T**ransmission **Rel**iability based studies (FMC-TRel methodology).

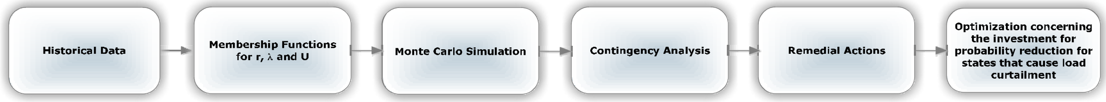


Fig. 4.1 – Diagram of the proposed methodology

The fuzzy set concept has been applied in the power system analysis and planning [10] but very little work has been done in the application of the fuzzy set theory together with Monte Carlo simulation method and mathematical programming optimization techniques to deal with reliability in transmission power systems. Pioneer work on this topic can be found in [44] and [45]. In [44] a fuzzy load model has been introduced into system reliability evaluation, whereas a probability distribution of outage data is converted into a fuzzy membership function for calculating the LOLE index in [45]. A new approach to incorporating a fuzzy load model in system reliability assessment has been presented in [46]. Reference [15] presented a method that combines fuzzy and probabilistic techniques. A fuzzy membership function with a probabilistic mean value is developed to model outage parameters, whereas a fuzzy representation for the peak load with the probability distribution for a load curve is developed to model the system load. The same reference presents a hybrid method of fuzzy set and Monte Carlo simulation to evaluate fuzzy membership functions of risk indices. Reference [8] presents a fuzzy model of overhead line weather-related outages and a combined technique of the probability theory and the fuzzy set to incorporate weather effects in transmission system reliability assessment.

4.1 Monte carlo simulation

The Monte Carlo method appeared in the XVIII century when the French scientist Buffon proposed a method to estimate the value of $\boldsymbol{\pi}$. The method consisted in launching a needle with length $\boldsymbol{d}$ in a plane with parallel lines equally distanced (figure 4.2). The distance between the lines is $\boldsymbol{a}$, with $\boldsymbol{a} > \boldsymbol{d}$. The probability of the needle touching a line is $\boldsymbol{P} = \frac{2 \cdot d}{\pi \cdot a}$. After a significant number of launches, $\boldsymbol{P}$ is estimated. Knowing $\boldsymbol{P}$, $\boldsymbol{\pi}$ is calculated by $\boldsymbol{\pi} = \frac{2 \cdot d}{P \cdot a}$ [47].

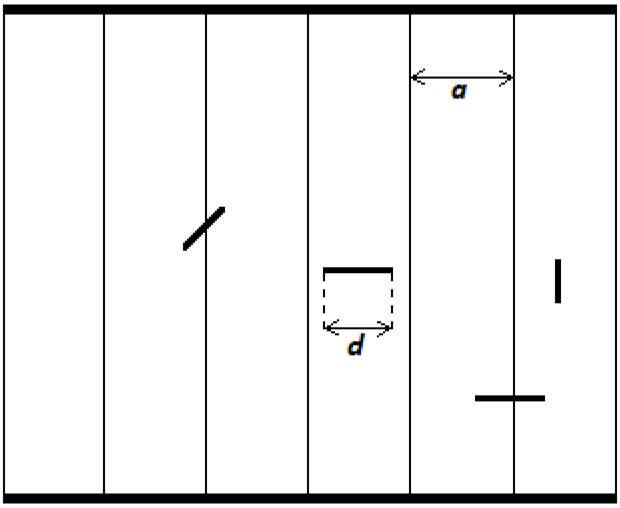


Fig. 4.2 – Buffon needle launching

However, it was only after electronic computers were first built (from 1945 on) that Monte Carlo methods began to be studied in depth. In the 1950s it has been used for early work related with the development of the hydrogen bomb, and became popularized in the fields of physics, physical chemistry, and operations research. The *Rand Corporation* and the *U.S. Air Force* were two of the major organizations responsible for funding and disseminating information on Monte Carlo methods during this time [39].

The basic idea of MCS is creating a series of experimental samples using a random number sequence. According to the *Central Limit Theorem* or the *Law of Large Numbers*, the sample mean can be used as an unbiased estimate of the mathematical expectation when the number of samples is large enough. The variance of the sample mean is an indicator of estimation accuracy [20].

4.1.1 Simulation methods

The simulation methods are classified as *Nonsequential* or *Sequential sampling*.

Nonsequential

This method has been widely used in power systems risk evaluation. The concept of this simulation is based on the fact that a system state is a combination of all its components states and each component state can be determined by sampling the probability of the component appearing in that state [20, 22, 42, 48]. Each component can be modeled using an uniform distribution in the interval [0, 1]. Let us assume that each component has two states (failure and success) and that component failures are independent of each other. Let $\boldsymbol{S_i}$ denote the state of the $\boldsymbol{ith}$ component and $\boldsymbol{Q_i}$ its failure probability. Generate a random number $\boldsymbol{R_i}$ distributed uniformly between [0, 1] for the $\boldsymbol{ith}$ component:

$$\boldsymbol{S_i = \begin{cases} (success) & if \quad R_i > Q_i \\ (failure) & if \ 0 \leq R_i \leq Q_i \end{cases}} \tag{4.1}$$

The system state containing *N* components is depicted by the vector *S*:

$$\boldsymbol{S = (S_1, \dots, S_i, \dots, S_N)} \tag{4.2}$$

It should be noted that the random numbers must meet three basics requirements: uniformity, independence and long repeat cycle [20]. As the MCS is a fluctuating process, there is no guarantee that a few more samples will definitely lead to a smaller error. However it is true that the confidence band decreases as the number of samples increases.

An appropriate convergence criterion is the key to assure accuracy in MCS. The coefficient of variance is often used as the stopping rule in the sampling. An alternative is to use a specified maximum number of samples as the stopping rule. When the simulation process ends, the coefficient of variance is checked to see whether it is small enough. If not, a new run with an increased number of samples is necessary [20]. The failure probability of components is the only input data needed in the sample process for nonsequential process.

Sequential

Sequential Monte Carlo method refers to a simulation process over a chronological time span [20, 22] using algorithms that use the failures rates (λ) and repair rates (μ) of each component. The most popular approach to create an artificial system state transition cycle is called state duration sampling and is based on sampling a probability distribution of component state duration. State duration sampling approach can be resumed by the following steps:

1. Generally, all components are assumed to be in the up state initially;
2. Sample the duration of each component residing in its present state. The probability distribution of the state duration should be assumed. Different states such as operation or repair process may assume different probability distributions for the state duration [20, 22]. For instance, the sampling value of the state duration following an exponential distribution is given by:

   $$\boldsymbol{Sd_i = \frac{ln(R_i)}{\varphi_i}} \qquad 4.3$$

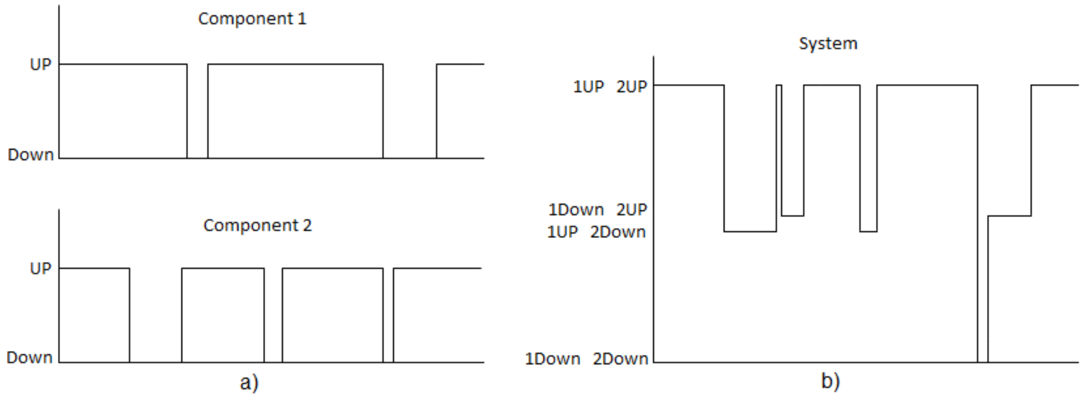
   where:

   $\boldsymbol{\varphi_i}$ is the failure rate if the present state is the up state; $\boldsymbol{\varphi_i}$ is the repair rate if the present state is the down state; $\boldsymbol{R_i}$ is a uniformly distributed random number in the interval [0, 1] corresponding to the *ith* component. The sampling values of each state duration for all components in the considered time span must be recorded.
3. The previous step must be repeated to the time span considered (years) and the sampling values of each state duration for all components must be recorded. Figure 4.3a) shows the chronological state transition processes for a example with two components;
4. The chronological system state transition cycle can be obtained combining the state transition processes of all components as can be seen in figure 4.3b);
5. Perform the system analysis for each different state to calculate the risk index functions. Equations 4.4 – 4.6 are the three general formulas of the risk indices [20].

$$\boldsymbol{P_f} = \frac{\sum_{k=1}^{M_{dn}} \boldsymbol{D_{dk}}}{\sum_{k=1}^{M_{dn}} \boldsymbol{D_{dk}} + \sum_{j=1}^{M_{up}} \boldsymbol{D_{uj}}} \tag{4.4}$$

$$\boldsymbol{F_f} = \frac{\boldsymbol{M_{dn}}}{\sum_{k=1}^{M_{dn}} \boldsymbol{D_{dk}} + \sum_{j=1}^{M_{up}} \boldsymbol{D_{uj}}} \tag{4.5}$$

$$\boldsymbol{D_f} = \frac{\sum_{k=1}^{M_{dn}} \boldsymbol{D_{dk}}}{\boldsymbol{M_{dn}}} \tag{4.6}$$



a) b)

Fig. 4.3 – a) Chronological state transition processes of components 1 and 2 b) Chronological system state transition processes

4.1.2 Accuracy level of Monte Carlo simulation

An appropriate convergence criterion is the key to assure accuracy in MCS.

The system component failure probability is denoted by $\boldsymbol{Q}$ and $\boldsymbol{x_i}$ is a zero-one indicator variable:

$\boldsymbol{x_i = 0}$ → if the system has all components in up state

$\boldsymbol{x_i = 1}$ → if the system has at least one component in down state

The failure probability estimation is given by:

$$\boldsymbol{\bar{Q}} = \frac{\boldsymbol{1}}{\boldsymbol{N}} \sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \boldsymbol{x_i} \tag{4.7}$$

where $\boldsymbol{N}$ is the number of system state samples.

The unbiased sample variance is:

$$\boldsymbol{V(x) = \frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{Q})^2} \tag{4.8}$$

If the sample size is large enough, equation 4.8 can be approximated by:

$$\boldsymbol{V(x) = \frac{1}{N}\sum_{i=1}^{N}(x_i - \bar{Q})^2} \tag{4.9}$$

$\boldsymbol{x_i}$ is a zero-one variable so it follows:

$$\boldsymbol{\sum_{i=1}^{N} x_i^2 = \sum_{i=1}^{N} x_i} \tag{4.10}$$

Substitute equations 4.7 and 4.10 into equation 4.9 yields we have:

$$\boldsymbol{\begin{gathered} V(x) = \frac{1}{N}\sum_{i=1}^{N} x_i^2 - \frac{1}{N}\sum_{i=1}^{N} 2x_i\bar{Q} + \frac{1}{N}\sum_{i=1}^{N} \bar{Q}^2 \\ V(x) = \bar{Q} - 2\bar{Q}^2 + \bar{Q}^2 \\ V(x) = \bar{Q} - \bar{Q}^2 \end{gathered}} \tag{4.11}$$

Equation 4.7 gives only failure probability estimation, thus the uncertainty around the estimate can be measured by the variance of the expectation estimate:

$$\boldsymbol{\begin{gathered} V(\bar{Q})\frac{1}{N}V(x) \\ V(\bar{Q}) = \frac{1}{N}(\bar{Q} - \bar{Q}^2) \end{gathered}} \tag{4.12}$$

The coefficient of variation can express the accuracy level of Monte Carlo simulation, which is defined as:

$$\boldsymbol{\beta = \frac{\sqrt{V(\bar{Q})}}{\bar{Q}}} \tag{4.13}$$

Through substitution of equation 4.12 into equation 4.13 we have:

$$\boldsymbol{\beta = \sqrt{\frac{1 - \bar{Q}}{N \cdot \bar{Q}}}} \tag{4.14}$$

We can rewrite the equation 4.14 as:

$$\boldsymbol{N} = \frac{\boldsymbol{1 - \overline{Q}}}{\boldsymbol{\beta^2 \cdot \overline{Q}}} \tag{4.15}$$

Through equation 4.15 two important points can be seen:

- ✓ For a specific desired accuracy level $\boldsymbol{\beta}$, the number of samples $\boldsymbol{N}$ that are required depends of the failure probability but is independent from the system size. For large-scale system reliability evaluation the Monte Carlo simulation is the appropriate application to be used;
- ✓ If the unavailability or failure probability it is much smaller than 1, we can rewrite the equation 4.15 as:

$$\boldsymbol{N} \approx \frac{\boldsymbol{1}}{\boldsymbol{\beta^2 \cdot \overline{Q}}} \tag{4.16}$$

So, it is possible to conclude from equation 4.16 that the number of samples $\boldsymbol{N}$ is approximately inversely proportional to the failure probability. Thus, in the case of a very reliable system, a large number of samples is required to satisfy the given accuracy level.

4.2 Fuzzy set models creation for component outage parameters

4.2.1 Fuzzy set

In the real world, imprecision and ambiguity exist everywhere and many types of information have a degree of uncertainty. Computers are widely used to control, predict and provide decisions for the real world but they have difficulties in dealing with vague information [49]. For instance, how does a computer understand a command like “Increase the temperature a little”? Random events are successfully modeled by probability and statistic theory but vague information is not random and it is difficult to model it by using probability and statistic theory.

In 1965 L. A. Zadeh proposed the fuzzy set theory that provides a way to deal with the vagueness, imprecision and ambiguity in information [50]. This theory is a mathematical way to represent the uncertain nature of the information.

Definition

If $\boldsymbol{X}$ is a collection of objects denoted generically by $\boldsymbol{x}$ then a fuzzy set $\widetilde{\boldsymbol{A}}$ in $\boldsymbol{X}$ is a set of ordered pairs:

$$\widetilde{\boldsymbol{A}} = \{(\boldsymbol{x}, \mu_{\widetilde{A}}(\boldsymbol{x})) | \boldsymbol{x} \in \boldsymbol{X}\} \tag{4.17}$$

$\mu_{\widetilde{A}}$ is the membership function that maps $\boldsymbol{X}$ to the membership space $\boldsymbol{M}$ and $\mu_{\widetilde{A}}$ is the grade of membership of $\boldsymbol{x}$ in $\widetilde{\boldsymbol{A}}$ [51].

Using fuzzy set theory, computers can deal with vague information. The fuzzy set considers the concept of "grade of membership" of the set. In the crisp set, elements either belong to the set or do not belong to the set. For instance, let us consider crisp set *C = {all the values between 10 and 15}* (Figure 4.4). This means that only the values equal or greater than 10 and equal or lower than 15 belong to crisp set C; all other elements will not belong to C. The crisp set C membership function is:

$$\mathbf{u_c(X)} = \begin{cases} \mathbf{1} & \textbf{if} \quad \mathbf{10 \leq X \leq 15} \\ \mathbf{0} & \textbf{if} \quad \mathbf{X < 10} \vee \boldsymbol{X} > \mathbf{15} \end{cases} \tag{4.18}$$

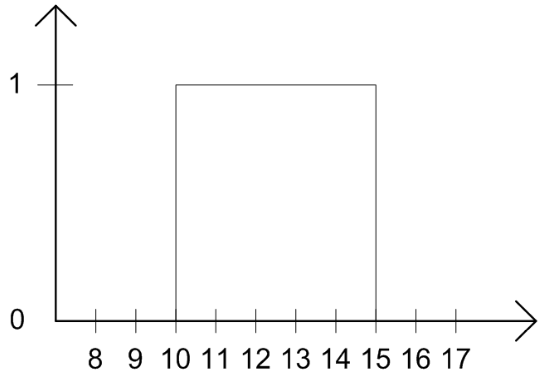


Fig. 4.4 – Crisp set C membership function

However, in contrast to the crisp set, elements can partially belong to a fuzzy set. The elements belong to the set, to "some degree" (degree of membership). The set membership function will represent the degree of membership to the fuzzy set. For instance, let us consider fuzzy set $\widetilde{\boldsymbol{A}} = \{\boldsymbol{all\ the\ values\ around}\ \mathbf{10}\ \boldsymbol{and}\ \mathbf{15}\}$ (Figure 4.5). This may mean that values equal or greater than 9 and lower than 10 belong to the function with a degree of true (dgt) $\leq \mathbf{dgt} < \mathbf{1}$. Values equal or lower than 16 and greater than 15 also belong to the same degree of true $\mathbf{0} \leq \mathbf{dgt} < \mathbf{1}$. Values equal or greater than 10 and equal or lower than 15 have a degree of true equal to 1. Other values will not belong to function $\tilde{\mathbf{A}}$.The membership function of $\tilde{\mathbf{A}}$ is:

$$\boldsymbol{u}_{\tilde{A}}(\boldsymbol{X}) = \begin{cases} \boldsymbol{X-9} & \boldsymbol{if} \quad \boldsymbol{9 \leq X < 10} \\ \boldsymbol{X-16} & \boldsymbol{if} \quad \boldsymbol{15 < X \leq 16} \\ \boldsymbol{1} & \boldsymbol{if} \quad \boldsymbol{10 \leq X \leq 15} \\ \boldsymbol{0} & \boldsymbol{if} \quad \boldsymbol{X < 9 \vee X > 16} \end{cases} \tag{4.19}$$

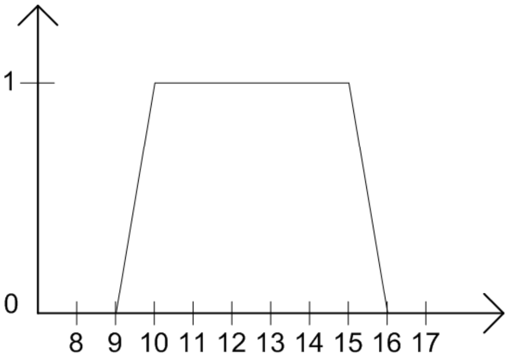


Fig. 4.5 – Fuzzy set Ã membership function

It is obvious that fuzzy set can express the idea of “around”, whereas the crisp set cannot. Crisp set is one of the subsets of fuzzy set. Adjusting fuzzy set membership function, a set can be obtained. With fuzzy set linguistic concepts, vagueness and ambiguous information can be modeled and included into mathematical models.

4.2.2 Fuzzy model for repair time

The repair time is a parameter that can be directly collected by a data collection system [15]. A sample mean of repair times can be easily calculated by direct average of repair times in different outage events by equation 3.1.

Let us consider that $\bar{\boldsymbol{r}}$ is the point estimate of repair time, $\boldsymbol{r_i}$ is the $\boldsymbol{i}\mathbf{th}$ repair time, and $\boldsymbol{n}$ is the number of repair times in the outage data. The confidence interval of the expected repair time can be estimated using the t-distribution [15, 41] (see section 3.2.2). Therefore, from equation 3.9 we have:

$$\boldsymbol{r_2 = \bar{r} - t_{\alpha/2}(n-1)\frac{s}{\sqrt{n}}} \tag{4.20}$$

$$\boldsymbol{r_3 = \bar{r} + t_{\alpha/2}(n-1)\frac{s}{\sqrt{n}}} \tag{4.21}$$

$$\boldsymbol{r_2 \leq \mu \leq r_3} \tag{4.22}$$

Equation 4.22 indicates that the real expected repair time ($\boldsymbol{\mu}$) is located between the lower ($\boldsymbol{r_2}$) and higher ($\boldsymbol{r_3}$) bounds which are determined by sampled repair times.

With the point and interval estimates, a triangle membership function of repair time *r* (in hours per failure) can be easily created [15] as shown in figure 4.6. The point estimate $\boldsymbol{\bar{r}}$ corresponds to 1 of the membership function grade. The significant level $\boldsymbol{\alpha}$ is always a small value such as 0.05. The half of $\boldsymbol{\alpha}$ is located at each of the two bounds in t-distribution. Conceptually, the significant level is somehow similar to the fuzzy degree represented by the membership function grade since both of them reflect a subjective confidence [15].

With the points $\boldsymbol{(r_2, {}^{\alpha}/_{2})}$, $\boldsymbol{(\bar{r}, 1)}$ and $\boldsymbol{(r_3, {}^{\alpha}/_{2})}$, two linear algebraic equations in the form of $\boldsymbol{y = m \cdot x + b}$ can be built and the two end points $\boldsymbol{(r_1, 0)}$ and $\boldsymbol{(r_4, 0)}$ in the membership function can be calculated. The repair time membership function obtained from equations 3.1 and 4.22 is a symmetric one. It is important to note that the two bounds of repair time can be also determined or modified based on the judgment of experienced maintenance personal, if necessary [15].

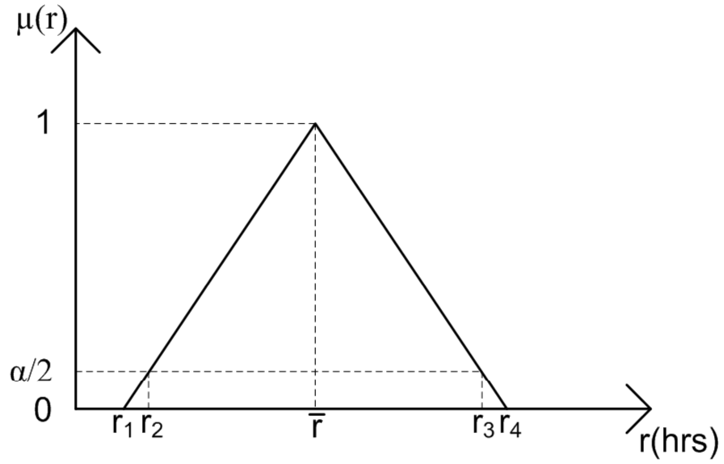


Fig. 4.6 – Repair time membership function

In order to fuzzy repair time model become clearer a practical application is presented.

Example for fuzzy repair time model

Let us assume a system component for which the historical outage data for ten years are presented in table 4.1.

Table 4.1 – Historical data for one component

Component Number	**Transmission Line Bus 11 to Bus 13**			
	Year	**Outage**	**Time (hours)**	**Forced average disconnection time (hours)**
18	2000	1	7.50	9.50
		2	11.50	
	2001	NA	NA	NA
	2002	NA	NA	NA
	2003	NA	NA	NA
	2004	NA	NA	NA
	2005	1	15	15
	2006	NA	NA	NA
	2007	NA	NA	NA
	2008	1	10	10
	2009	NA	NA	NA
Std. Dev.	**Number of Years**	**Number of Outages**	**Total Time (hours)**	**Average (hours)**
3.135815	10	4	44.00	11.00

The estimate point of repair time is calculated by equation 3.1, so:

$$\bar{r} = \frac{1}{4} \times (7.50 + 11.50 + 15 + 10) \qquad (4.23)$$

$$\bar{r} = 11\ hours$$

The confidence interval of the expected repair time can be estimated by equations 4.20 and 4.21, thus:

$$t_{\alpha/2}(n-1) <=> t_{\alpha/2}(4-1)$$

By annex 1, $t_{\alpha/2}(4-1)$ is equal to 3.182

$$r_2 = 11 - 3.182 \times \frac{3.135815}{\sqrt{4}} \qquad (4.24)$$

$$r_2 = 6.01\ hours$$

$$\boldsymbol{r_3 = 11 + 3.182 \times \frac{3.135815}{\sqrt{4}}}$$

$$\boldsymbol{r_3 = 15.99\ hours}$$

Now, we are in conditions to determine the two linear algebraic equations in the form of $\boldsymbol{y = m \cdot x + b}$ in order to calculate the $\boldsymbol{r_1}$ and $\boldsymbol{r_4}$ points. Let considerer $\boldsymbol{y_{r1} = m_{r1} \cdot x_{r1} + b_{r1}}$ the algebraic equation on the left of $\boldsymbol{\bar{r}}$ and $\boldsymbol{y_{r2} = m_{r2} \cdot x_{r2} + b_{r2}}$ on the right of $\boldsymbol{\bar{r}}$:

$$\boldsymbol{m_{r1} = \frac{1 - 0.025}{11 - 6.01} = 0.1954}$$

$$\boldsymbol{b_{r1} = 1 - (0.1954 \times 11) = -1.1494} \tag{4.25}$$

$$\boldsymbol{y_{r1} = 0.1954 \cdot x_{r1} - 1.1494}$$

$$\boldsymbol{m_{r2} = \frac{1 - 0.025}{11 - 15.99} = -0.1954}$$

$$\boldsymbol{b_{r2} = 1 - (-0.1954 \times 11) = 3.1494} \tag{4.26}$$

$$\boldsymbol{y_{r2} = -0.1954 \cdot x_{r2} + 3.1494}$$

To determine $\mathbf{r_1}$, $\mathbf{y_{r1}}$ is equal to zero, i.e., $(\mathbf{r_1}, \mathbf{0})$, so:

$$\boldsymbol{y_{r1} = 0.1954 \cdot r_1 - 1.1494}$$

$$\boldsymbol{r_1 = \frac{0 + 1.1494}{0.1954} = 5.8823\ hours} \tag{4.27}$$

To determine $\boldsymbol{r_4}$, $\boldsymbol{y_{r2}}$ is equal to zero, i.e., $(\boldsymbol{r_4}, \mathbf{0})$, so:

$$\boldsymbol{y_{r2} = -0.1954 \cdot r_4 + 3.1494}$$

$$\boldsymbol{r_4 = \frac{3.1494 - 0}{0.1954} = 16.1177\ hours} \tag{4.28}$$

At this moment we are in conditions to represent the fuzzy membership function of repair time (Figure 4.7).

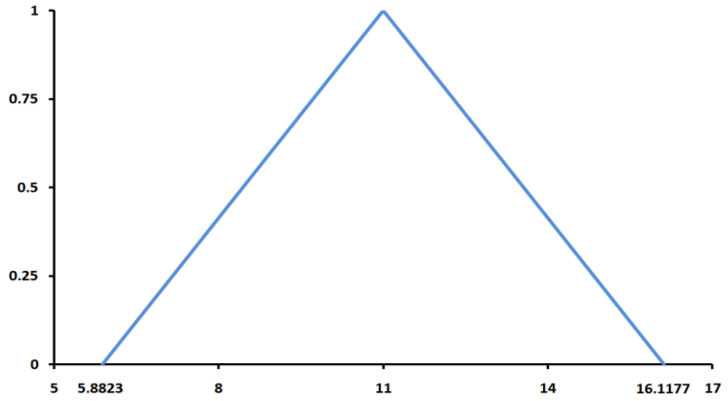


Fig. 4.7 – Example of fuzzy membership function for repair time

4.2.3 Fuzzy model for failure rate

For individual components the failure frequency cannot be obtained directly by a sample mean of frequencies for each single component. The raw data are in the form of failure events. The failure frequency is calculated as average failures per year over a time period [15, 20]. The point estimate of failure frequency is calculated by 3.14.

The confidence interval of the expected failure frequency can be estimated by 3.17. Let us consider that $\boldsymbol{\lambda}$ is the expected failure rate, $\boldsymbol{T}$ is the total time period considered and $\boldsymbol{F}$ is the number of failures during $\boldsymbol{T}$. Equation 3.16 indicates that the quantity of two times the expected failures in the duration $\boldsymbol{T}$ follows the $\boldsymbol{\chi^2}$ distribution with $(\mathbf{2} \cdot \boldsymbol{F})$ degree of freedom. Hence, for the given significant level $\boldsymbol{\alpha}$, it can be stated that the failure rate $\boldsymbol{\lambda}$ falls into the random confidence interval indicated by equations 4.29 and 4.30, with the probability of $\mathbf{1} - \boldsymbol{\alpha}$.

Equation 3.17 will give the lower and higher bounds of failure rate, which are determined using failure data. The failure rate $\boldsymbol{\lambda}$ and failure frequency $\boldsymbol{f}$ are numeric with very close values for power system components although they are conceptually different [15, 20, 22]. $\boldsymbol{f}$and $\boldsymbol{\lambda}$ are often replaced by each other in practical engineering calculations of power system risk evaluation [15]. Hence, 3.17 can be used to estimate the two bounds of failure rate. Thus we have:

$$\boldsymbol{\lambda}_2 = \frac{\boldsymbol{\chi}^2_{1-\alpha/2}(\mathbf{2} \cdot \boldsymbol{F})}{\mathbf{2} \cdot \boldsymbol{T}} \tag{4.29}$$

$$\lambda_3 = \frac{\chi^2_{\alpha/2}(\mathbf{2} \cdot \boldsymbol{F})}{\mathbf{2} \cdot \boldsymbol{T}} \tag{4.30}$$

These bounds can be also determined or adjusted by experienced personal, particularly when effects of weather, environment or operation conditions on the failure frequency are considered [15].

A triangle membership function of failure rate can be easily created using the point and interval estimates of failure rate, as shown in figure 4.8. It can be seen that the membership function of failure rate is not symmetric. Usually, the range between the point estimate and its higher bound is much larger than that between the point estimate and its lower bound when 3.17 is used.

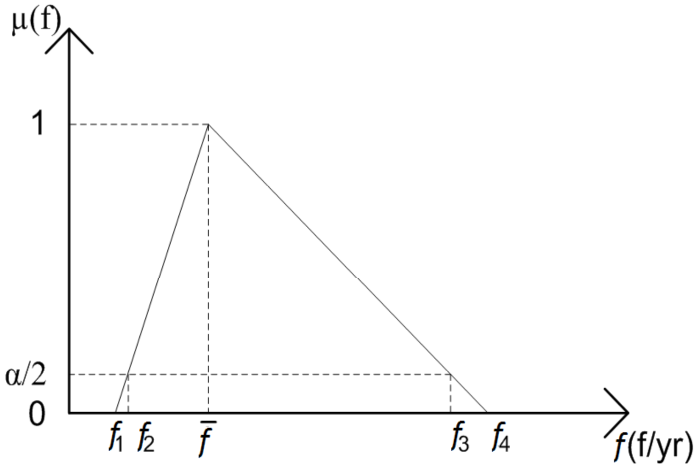


Fig. 4.8 – Failure rate membership function

A practical application of fuzzy failure rate model is presented below.

<u>Example for fuzzy failure rate model</u>

Let us consider the data in table 4.1 where all failures are repairable.

The point estimate of failure frequency is calculated by 3.14 and, as its said before, $\boldsymbol{f} \cong \boldsymbol{\lambda}$, where $\boldsymbol{f}$ is the failure frequency and $\boldsymbol{\lambda}$ is the failure rate, so:

$$\bar{\boldsymbol{\lambda}} = \frac{\mathbf{4}}{\mathbf{10}} = \mathbf{0.4}\, \boldsymbol{failures/year} \tag{4.31}$$

The confidence interval of the expected failure rate can be estimated by equations 4.29 and 4.30. The values of $\chi^2_{1-\alpha/2}$ and $\chi^2_{\alpha/2}$ can be found in annex 2.

$$\lambda_2 = \frac{\chi^2_{1-\alpha/2}(2\cdot 4)}{2\cdot 10}$$

$$\lambda_2 = \frac{2.180}{2\cdot 10} = 0.1090\, failures/year \tag{4.32}$$

$$\lambda_3 = \frac{\chi^2_{\alpha/2}(2\cdot 4)}{2\cdot 10}$$

$$\lambda_3 = \frac{17.535}{2\cdot 10} = 0.8768\, failures/year \tag{4.33}$$

We can now determine the two linear algebraic equations in the form of $\boldsymbol{y = m\cdot x + b}$ in order to calculate the $\boldsymbol{\lambda_1}$ and $\boldsymbol{\lambda_4}$ points. Considering $\boldsymbol{y_{\lambda 1} = m_{\lambda 1}\cdot x_{\lambda 1} + b_{\lambda 1}}$ the algebraic equation on the left of $\boldsymbol{\bar{f}}$ and $\boldsymbol{y_{\lambda 2} = m_{\lambda 2}\cdot x_{\lambda 2} + b_{\lambda 2}}$ on the right of $\boldsymbol{\bar{f}}$:

$$m_{\lambda 1} = \frac{1 - 0.025}{0.4 - 0.1090} = 3.3505$$

$$b_{\lambda 1} = 1 - (3.3505 \times 0.4) = -0.3402 \tag{4.34}$$

$$y_{\lambda 1} = 3.3505\cdot x_{\lambda 1} - 0.3402$$

$$m_{\lambda 2} = \frac{1 - 0.025}{0.4 - 0.8768} = -2.0449$$

$$b_{\lambda 2} = 1 - (-2.0449 \times 0.4) = 1.8180 \tag{4.35}$$

$$y_{\lambda 2} = -2.0449\cdot x_{\lambda 2} + 1.8180$$

To determine $\boldsymbol{\lambda_1}$, $\boldsymbol{y_{r1}}$ is equal to zero, i.e., $(\boldsymbol{\lambda_1, 0})$, so:

$$y_{\lambda 1} = 3.3505\cdot \lambda_1 - 0.3402$$

$$\lambda_1 = \frac{0 + 0.3402}{3.3505} = 0.1015\, failures/year \tag{4.36}$$

To determine $\boldsymbol{\lambda_4}$, $\boldsymbol{y_{\lambda 2}}$ is equal to zero, i.e., $(\boldsymbol{\lambda_4, 0})$, so:

$$y_{\lambda 2} = -2.0449\cdot \lambda_4 + 1.8180 \tag{4.37}$$

$$\boldsymbol{\lambda_4 = \frac{1.8180 - 0}{2.0449} = 0.8890\, failures/year}$$

At this moment we are in conditions to represent the fuzzy membership function of failure rate (Figure 4.9).

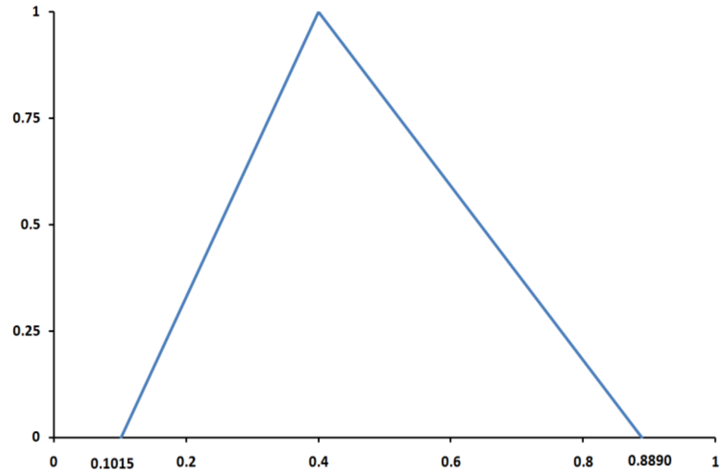


Fig. 4.9 – Example of fuzzy membership function for failure rate

4.2.4 Fuzzy model for unavailability

The forced outage rate or unavailability of system components ($\boldsymbol{U}$) can be determined using the failure frequency (failure rate) and repair time [15]:

$$\boldsymbol{U \cong \lambda \times r} \tag{4.38}$$

The membership function of unavailability can be obtained from $\boldsymbol{\lambda}$ and $\boldsymbol{r}$ (figures 4.4 and 4.6). For this, the interval calculation rules for a given membership function grade must be used [15].

It should be noted that with the multiplication of two triangle membership functions, the membership function of unavailability is no longer a triangle, it looks like a distorted triangle, as shown in figure 4.10.

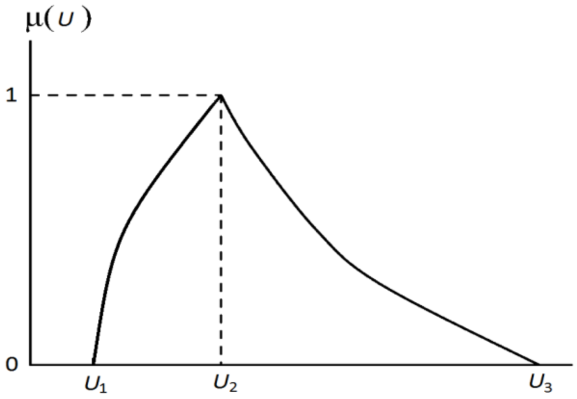


Fig. 4.10 – Unavailability membership function

To make this clearer, a practical application of fuzzy unavailability model is presented below.

<u>Example for fuzzy unavailability model</u>

Let us consider the same data in table 4.1 and the results of the two previous models (repair time and failure rate model).

Through equation 4.38, it is possible to obtain the function of unavailability. Let us see the results for the minimum, maximum and the expected unavailability:

$$\boldsymbol{U_1 = \frac{0.1015}{8760 - 5.8823} \times 5.8823 = 6.8203 \times 10^{-5}}$$

$$\boldsymbol{U_2 = \frac{0.4}{8760 - 11} \times 11 = 5.0291 \times 10^{-4}} \tag{4.39}$$

$$\boldsymbol{U_3 = \frac{0.8890}{8760 - 16.1177} \times 16.1177 = 0.0016}$$

Figure 4.11 depicts the function of unavailability for the component that has been considered for the illustrative examples presented in sub-sections 4.2.2, 4.2.3 and 4.2.4.

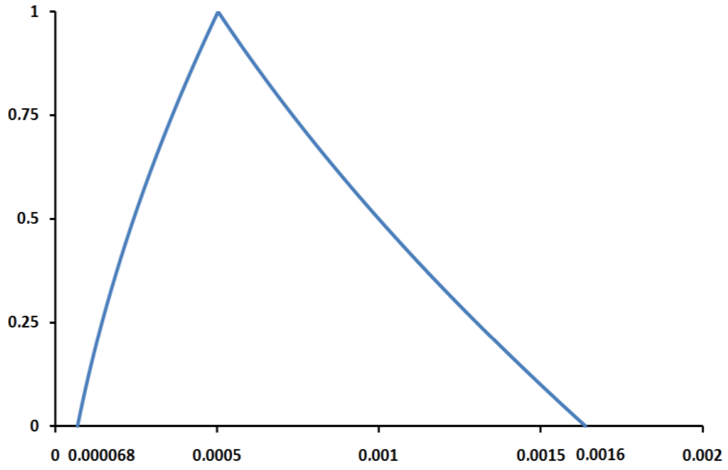


Fig. 4.11 – Example of fuzzy membership function for unavailability

4.3 FMC-TRel methodology

Figure 4.12 presents the flowchart for the proposed FMC-TRel Methodology. FMC-TRel is intended only for independent forced outages and has six main aspects: creation of data base, fuzzy models for repair time, failure rate and unavailability, selection of system states, contingency analysis, remedial actions and investment in order to reduce the failure probability. These aspects are presented in more detail as follows:

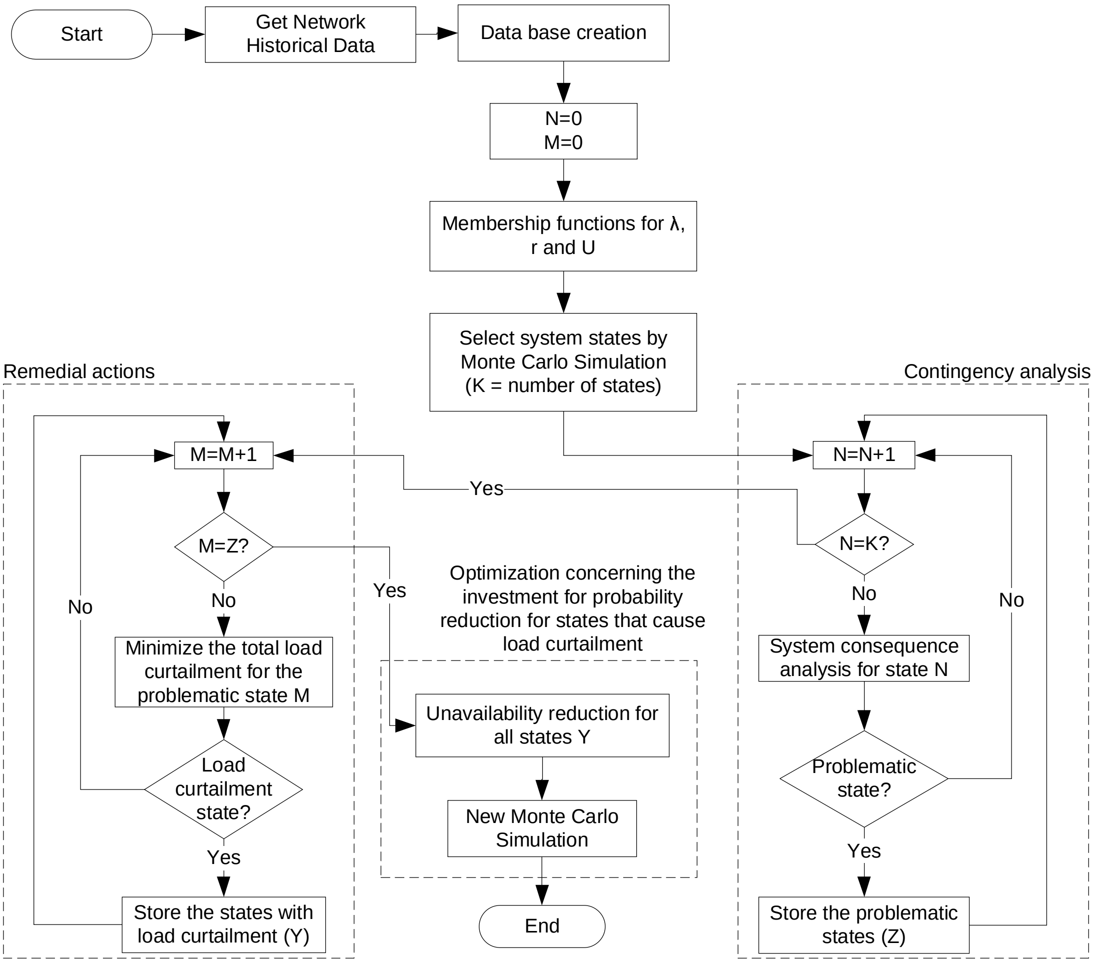


Fig. 4.12 – FMC-TRel flowchart

1. <u>Data base creation</u>

   A consistent data base creation and an exhaustive statistical analysis of all available information – repair times, number of repairs, number of failures, number of repairable failures, time period analysis, the necessary cost to change the failure rate of components and the necessary cost to change the repair time of components – are the main basis for the proposed methodology.

2. <u>Fuzzy models for repair time, failure rate and unavailability</u>

   A forced outage happens randomly and is totally out of human control. On the other hand, a planned outage is not directly caused by a failure; it is scheduled by personnel, to accomplish a maintenance or replacement activity. Therefore, the models for the fuzzy sets creation are valid only for the forced outages.

   The membership functions for failure rates and repair times for all system components are created, using equations 3.1, 3.14, 4.20–4.22 and 4.29–4.30. As result, the membership function of unavailability can be calculated by equation 4.38.

3. Selection of system states

   Generating units are represented using the two-state model (up and down). Transmission components can include overhead lines, cables, transformers, capacitors, circuit breakers and reactors. In general, these components are represented using the two-state (up and down) model. The two-state models for generating units and transmission components are created by Nonsequential Monte Carlo simulation (equations 4.1 and 4.2) in order to obtain a sample of all possible transmission power system states.

4. Contingency analysis

   The idea is to calculate the line flows and bus voltages following one or more component failures, for each failure system state, and identify if there is any overloading and/or voltage violation. The transmission contingency analysis technique used is supported by an AC Power Flow.

5. Remedial actions

   When an outage causes problems in the system (overloading, voltage violation), a remedial action algorithm, based on optimal power flow (OPF) (equations 4.40 to 4.51) is used to reschedule generation and alleviate constraint violations and, at the same time, to avoid any load curtailment, if possible, or, otherwise, to minimize the load curtailment, for the states identified by the contingency analysis. The objective function of the OPF model minimizes the total load curtailment, whereas load curtailments at buses are the solutions of the model.

$$\boldsymbol{min \sum_{i \in LG} Pcut_i + Qcut_i} \tag{4.40}$$

$$\boldsymbol{PGEN_i^{min} \leq PGEN_i \leq PGEN_i^{max} \qquad i \in GN} \tag{4.41}$$

$$\boldsymbol{QGEN_i^{min} \leq QGEN_i \leq QGEN_i^{max} \qquad i \in GN} \tag{4.42}$$

$$Pcut_i \leq Lp_i \qquad i \in LG \tag{4.43}$$

$$Qcut_i \leq Lq_i \qquad i \in LG \tag{4.44}$$

$$PGEN_i - Lp_i - P_i(v,\delta) + Pcut_i = 0 \qquad i \in GN \tag{4.45}$$

$$QGEN_i - Lq_i - Q_i(v,\delta) + Qcut_i = 0 \qquad i \in GN \tag{4.46}$$

$$P_i(v,\delta) + Lp_i - Pcut_i = 0 \qquad i \in LN \tag{4.47}$$

$$Q_i(v,\delta) + Lq_i - Qcut_i = 0 \qquad i \in LN \tag{4.48}$$

$$V_i^{min} \leq V_i \leq V_i^{max} \qquad i \in N \tag{4.49}$$

$$\delta_i^{min} \leq \delta_i \leq \delta_i^{max} \qquad i \in N \tag{4.50}$$

$$S_k(v,\delta) \leq S_k^{max} \tag{4.51}$$

where:

$Pcut_i$: Active load curtailment at bus i in p.u.

$Qcut_i$: Reactive load curtailment at bus i in p.u.

$PGEN_i$: Generated active power at bus i in p.u.

$PGEN_i^{max}$: Upper limit of generated active power at bus i in p.u.

$PGEN_i^{min}$: Lower limit of generated active power at bus i in p.u.

$QGEN_i$: Generated reactive power at bus i in p.u.

$QGEN_i^{max}$: Upper limit of generated reactive power at bus i in p.u.

$QGEN_i^{min}$: Lower limit of generated reactive power at bus i in p.u.

Lp_i: Real load at bus i in p.u.

Lq_i: Reactive load at bus i in p.u.

$P_i(v,\delta)$: Real power injections at bus i in p.u.

$Q_i(v,\delta)$: Reactive power injections at bus i in p.u.

V_i: voltage magnitude at bus i in p.u.

V_i^{max}: Upper limit of voltage magnitude at bus i in p.u.

$\boldsymbol{V_i^{min}}$: Lower limit of voltage magnitude at bus $\boldsymbol{i}$ in p.u.

$\boldsymbol{\delta_i}$: Voltage angle at bus $\boldsymbol{i}$ in p.u.

$\boldsymbol{\delta_i^{max}}$: Upper limit of voltage angle at bus $\boldsymbol{i}$ in p.u.

$\boldsymbol{\delta_i^{min}}$: Lower limit of voltage angle at bus $\boldsymbol{i}$ in p.u.

$\boldsymbol{S_k(v,\delta)}$: Power flow on line $\boldsymbol{k}$ in p.u.

$\boldsymbol{S_k^{max}}$: Rating limit of line $\boldsymbol{k}$ in p.u.

$\boldsymbol{LG}$: Bus with loads (generator bus and load bus that contain loads)

$\boldsymbol{GN}$: Generator bus

$\boldsymbol{LN}$: Load bus

$\boldsymbol{N}$: All bus

The $\boldsymbol{P_i(v,\delta)}$, $\boldsymbol{Q_i(v,\delta)}$ and $\boldsymbol{S_k(v,\delta)}$ have the following equations (4.52 – 4.56):

$$\boldsymbol{P_i(v,\delta) = V_i \sum_{j\to i} V_j\left(G_{ij}\cdot \cos\delta_{ij} + B_{ij}\cdot \sin\delta_{ij}\right)} \tag{4.52}$$

$$\boldsymbol{Q_i(v,\delta) = V_i \sum_{j\to i} V_j\left(G_{ij}\cdot \sin\delta_{ij} - B_{ij}\cdot \cos\delta_{ij}\right)} \tag{4.53}$$

where $\boldsymbol{j \to i}$ denotes that $\boldsymbol{j}$ are the buses directly connected to bus $\boldsymbol{i}$ through lines. $\boldsymbol{G_{ij}}$ and $\boldsymbol{B_{ij}}$ are the real and imaginary parts of the $\boldsymbol{i}$**th** row and $\boldsymbol{j}$**th** column elements of the bus admittance matrix; $\boldsymbol{\delta_{ij}}$ is the difference between buses *i* and *j* voltage angles, that is, $\boldsymbol{\delta_{ij} = \delta_i - \delta_j}$.

$$\boldsymbol{S_k(v,\delta) = max\{S_{ij}(v,\delta), S_{ji}(v,\delta)\}} \tag{4.54}$$

$$\boldsymbol{S_{ij}(v,\delta) = \sqrt{P_{ij}^2(v,\delta) + Q_{ij}^2(v,\delta)}} \tag{4.55}$$

$$\boldsymbol{S_{ji}(v,\delta) = \sqrt{P_{ji}^2(v,\delta) + Q_{ji}^2(v,\delta)}} \tag{4.56}$$

where $\boldsymbol{S_{ij}(v,\delta)}$ and $\boldsymbol{S_{ji}(v,\delta)}$ are power flows at the two ends of line $\boldsymbol{k}$. The $\boldsymbol{i}$ and $\boldsymbol{j}$ are the two buses which are connected by line $\boldsymbol{k}$.

6. Optimization concerning the investment for probability reduction for states that cause load curtailment

   For each system state that causes load curtailment a mathematical model (equations 4.57 to 4.60) is applied in order to reduce the probability of occurrence of the state that cause load curtailment while minimizing the costs to achieve that reduction.

   It is important to note that the model must run in a single run for each state that causes load curtailment.

   The model has the following formulation:

$$\boldsymbol{min}\sum_{\boldsymbol{i=1}}^{\boldsymbol{N}} \boldsymbol{C}_{\Delta \boldsymbol{r}\boldsymbol{i}} \times \Delta \boldsymbol{r}_{\boldsymbol{i}} + \boldsymbol{C}_{\Delta \boldsymbol{\lambda} \boldsymbol{i}} \times \Delta \boldsymbol{\lambda}_{\boldsymbol{i}} \tag{4.57}$$

$$\Delta \boldsymbol{\lambda}_{\boldsymbol{i}}^{\boldsymbol{min}} \leq \Delta \boldsymbol{\lambda}_{\boldsymbol{i}} \leq \Delta \boldsymbol{\lambda}_{\boldsymbol{i}}^{\boldsymbol{max}} \tag{4.58}$$

$$\Delta \boldsymbol{r}_{\boldsymbol{i}}^{\boldsymbol{min}} \leq \Delta \boldsymbol{r}_{\boldsymbol{i}} \leq \Delta \boldsymbol{r}_{\boldsymbol{i}}^{\boldsymbol{max}} \tag{4.59}$$

$$(\boldsymbol{\lambda}_{\boldsymbol{i}} \times \boldsymbol{r}_{\boldsymbol{i}}) \times \boldsymbol{\Delta}_{\boldsymbol{i}} = \Delta \boldsymbol{\lambda}_{\boldsymbol{i}} \times \boldsymbol{r}_{\boldsymbol{i}} + \Delta \boldsymbol{r}_{\boldsymbol{i}} \times \boldsymbol{\lambda}_{\boldsymbol{i}} \tag{4.60}$$

where:

$\mathbf{N}$: Number of failure components in the studied system state

$\mathbf{C}_{\Delta \mathbf{ri}}$: Necessary cost to reduce the repair time of component $\boldsymbol{i}$ in m.u.

$\mathbf{C}_{\Delta \boldsymbol{\lambda} \mathbf{i}}$: Necessary cost to reduce the failure rate of component $\boldsymbol{i}$ in m.u.

$\Delta \mathbf{r}_{\mathbf{i}}$: Necessary reduction of repair time variable of component $\boldsymbol{i}$ in hours/failure

$\Delta \boldsymbol{\lambda}_{\mathbf{i}}$: Necessary reduction of failure rate variable of component $\boldsymbol{i}$ in failures/year

$\Delta \mathbf{r}_{\mathbf{i}}^{\mathbf{min}}$: Lower limit of necessary reduction of repair time of component $\boldsymbol{i}$ in hours/failure

$\Delta \mathbf{r}_{\mathbf{i}}^{\mathbf{max}}$: Upper limit of necessary reduction of repair time of component $\boldsymbol{i}$ in hours/failure

$\Delta \boldsymbol{\lambda}_{\mathbf{i}}^{\mathbf{min}}$: Lower limit of necessary reduction of failure rate of component $\boldsymbol{i}$ in failures/year

$\Delta \boldsymbol{\lambda}_{\mathbf{i}}^{\mathbf{max}}$: Upper limit of necessary reduction of failure rate of component $\boldsymbol{i}$ in failures/year

$\boldsymbol{\lambda_i}$: Fuzzy failure rate of component $\boldsymbol{i}$ in failures/year (obtained by fuzzy models creation)

$\mathbf{r_i}$: Fuzzy repair time of component $\boldsymbol{i}$ in hours/failure (obtained by fuzzy models creation)

$\boldsymbol{\Delta_i}$: Variation applied in order to reduce the unavailability of component $\boldsymbol{i}$

Repair time reduction can be obtained by increasing operation personnel, upgrading the automation system, etc. Failure rate reduction can be achieved by reinforcing a line, moving a line to another location, putting a line in parallel with the existing one, replacing a transformer, etc.

For this model to become clearer let us see the following example:

Let us assume that we have a system with six components (Figure 4.13) and is in the following system state that causes load curtailment:

$$\boldsymbol{s} = \begin{bmatrix} \mathbf{1} & \mathbf{2} & \mathbf{3} & \mathbf{4} & \mathbf{5} & \mathbf{6} \\ \\ \mathbf{1} & \mathbf{0} & \mathbf{1} & \mathbf{1} & \mathbf{0} & \mathbf{0} \end{bmatrix} \tag{4.61}$$

where 1 denotes that a component is in down state and 0 denotes that a component is in up state. This example system has one generator (component number 2) and five transmission lines (component numbers 1 and 3 to 6). Our objective is to reduce in 20% the unavailability of each failure component in system state *s*, i.e, the unavailability of components 1, 3 and 4. The unavailability reduction, in these three components, will allow a reduction of the probability occurrence of state *s* in Monte Carlo simulation process. Table 4.2 presents the data used in this example.

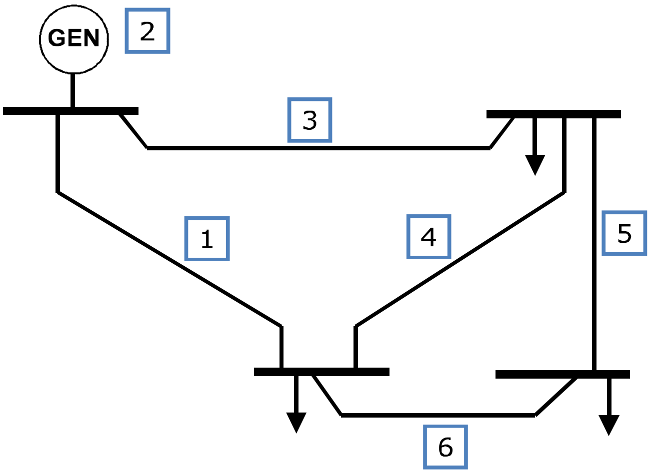
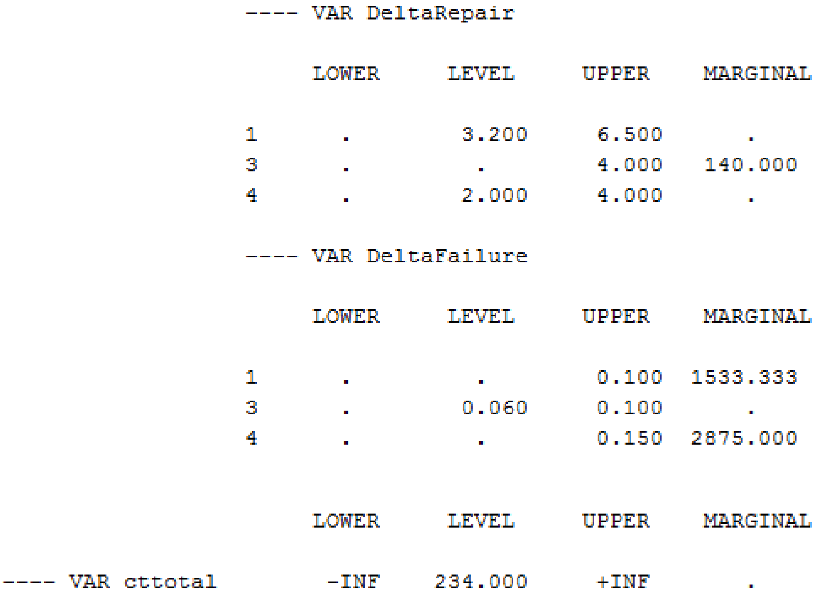


Fig. 4.13 – Example system with six components

Table 4.2 –Data for the example system with six components

Component	λ_{min}	λ	λ_{max}	r_{min}	r	r_{max}	$\Delta\lambda$ **Cost**	Δr **Cost**	$\Delta\lambda_i^{min}$	$\Delta\lambda_i^{max}$	Δr_i^{min}	Δr_i^{max}
	(Failures/Year)			**(Hours)**			**(m.u.)**		**(Hours)**			
1	0.20	0.30	0.50	13	16	19	2600	20	0	0.100	0	6.5
2	0.55	0.50	0.75	8	10	12	2250	150	0	0.275	0	4.0
3	0.20	0.30	0.50	8	10	12	2000	200	0	0.100	0	4.0
4	0.30	0.40	0.55	8	10	12	3500	25	0	0.150	0	4.0
5	0.55	0.50	0.75	8	10	12	2300	50	0	0.275	0	4.0
6	0.30	0.40	0.55	8	10	12	2200	60	0	0.150	0	4.0

Applying the mathematical model exposed in equations 4.57 to 4.60 we have the results presented in figure 4.14.



```
                  ---- VAR DeltaRepair

                       LOWER     LEVEL     UPPER    MARGINAL

                  1      .        3.200     6.500       .
                  3      .         .        4.000   140.000
                  4      .        2.000     4.000       .

                  ---- VAR DeltaFailure

                       LOWER     LEVEL     UPPER    MARGINAL

                  1      .         .        0.100  1533.333
                  3      .        0.060     0.100       .
                  4      .         .        0.150  2875.000


                       LOWER     LEVEL     UPPER    MARGINAL

---- VAR cttotal        -INF    234.000     +INF        .
```

Fig. 4.14 – Results of example obtained from GAMS

Obtained from the General Algebraic Modeling System (GAMS) for the considered example, these results mean that to achieve 20% unavailability reduction of each component in down state of considered system state we need to reduce the failure rate of component 3 in 0.060 failures per year and reduce the repair time of component 1 and 4 in 3.2 and 2.0 hours per failure, respectively. The minimum cost obtained for this reduction is 234 m.u. With the new fuzzy sets of failure rate and repair time we are able to calculate the new fuzzy set of unavailability for each component in down state. To verify and prove the probability reduction of the state *s* we need to run the Monte Carlo simulation process, considering the new values of unavailability for each component in down state.

4.4 Implementation tools

MATLAB language was used to create the fuzzy models for repair time, failure rate and unavailability of each system component, as well as to develop the Monte Carlo simulation algorithm used in this thesis.

MatPower [52], a package of MATLAB M-files that solves power flow problems, is the tool used to solve the AC Power Flow problem.

To develop the remedial action algorithm based on optimal power flow the General Algebraic Modeling System (GAMS) [53], which is a high-level modeling system for mathematical programming and optimization, is used. BDMLP [6] and CONOPT [54] are the solvers used to solve, respectively, the Mixed Integer Programming (MIP) and Non-Linear Programming (NLP) in this optimization problem. GAMS with CONOPT solver has been used to implement the algorithm to minimize the investment in the reduction of components failure probability.

4.5 Conclusions

This chapter presents the **F**uzzy **M**onte **C**arlo methodology for **T**ransmission **Rel**iability based studies proposed in this thesis (FMC-TRel methodology).The nonsequential and sequential simulation method in Monte Carlo simulation has been discussed, and it is evident that an appropriate convergence criterion is the key to assure accuracy in MCS.

The fuzzy logic theory is presented in a summarized way, followed by the fuzzy models for repair time, failure rate and unavailability are described and to become clearer an example for each model is present.

The risk assessment of transmission systems is the most complicated one, mainly due to the complexity in the system analysis. It requires the use of power flow and optimal power flow algorithms. An optimization technique for the minimization of the total load curtailment has been illustrated.

A mathematical model to reduce the probability of occurrence of the states that cause load curtailment in the transmission system while minimizing the costs to achieve that reduction is shown with a small example for the model become clearer.

The proposed methodology is a good basis for a decision-support tool to support the transmission system operator in the identification of critical components and in the planning of future investments in the transmission power system.

5 Case Study

The **F**uzzy **M**onte **C**arlo methodology for **T**ransmission **Rel**iability based studies (FMC-TRel) proposed in this thesis to reduce the probability occurrence of a system state which causes load curtailment has been described in the previous chapter. This chapter presents the results obtained with this methodology applied to a network test system. The chosen network test system was the Reliability Test System (RTS) 1996 IEEE 24 BUS [16].

This case study is made without the inductance (100MW) in bus 6. After initial tests, it was found that, with the presence of this inductance in bus 6 and the existence of a fault in line 6-10 (component 10), the remedial action algorithm based on optimal power flow did not found a feasible solution. Moreover, without this inductance in bus 6 and the existence of a fault in line 8-10 (component 13) and in line 10-11 (component 16) and / or in line 7-8 (component 11) and in line 10-11 (component 16), the remedial action algorithm did also not found a feasible solution. So, it has been decided to run the remedial action algorithm, initially, without inductance in bus 6 and then, for the states with components 13 and 16 and/or components 11 and 16 in down state, to consider the inductance in bus 6.

This case study has used a PC compatible with one processor Intel® Xeon® W3520 2.67GHz with four cores, 3GB of Random-Access-Memory (RAM) and Windows 7® Professional 32-Bit Operator System.

5.1 Reliability test system (RTS) 1996 IEEE 24 bus data

The IEEE RTS has been developed by the IEEE Reliability Subcommittee and publicized in 1978. The purpose of this system is to provide a benchmark system for testing reliability methods [55]. The benchmark system complements other IEEE standardized systems, which have offered engineers and researchers common test-beds on which to test their algorithms [55]. Over the years, the reliability test system has been used for testing reliability methods and also for a variety of other analysis methods. A general layout of IEEE RTS 24 BUS system is illustrated in figure 5.1.

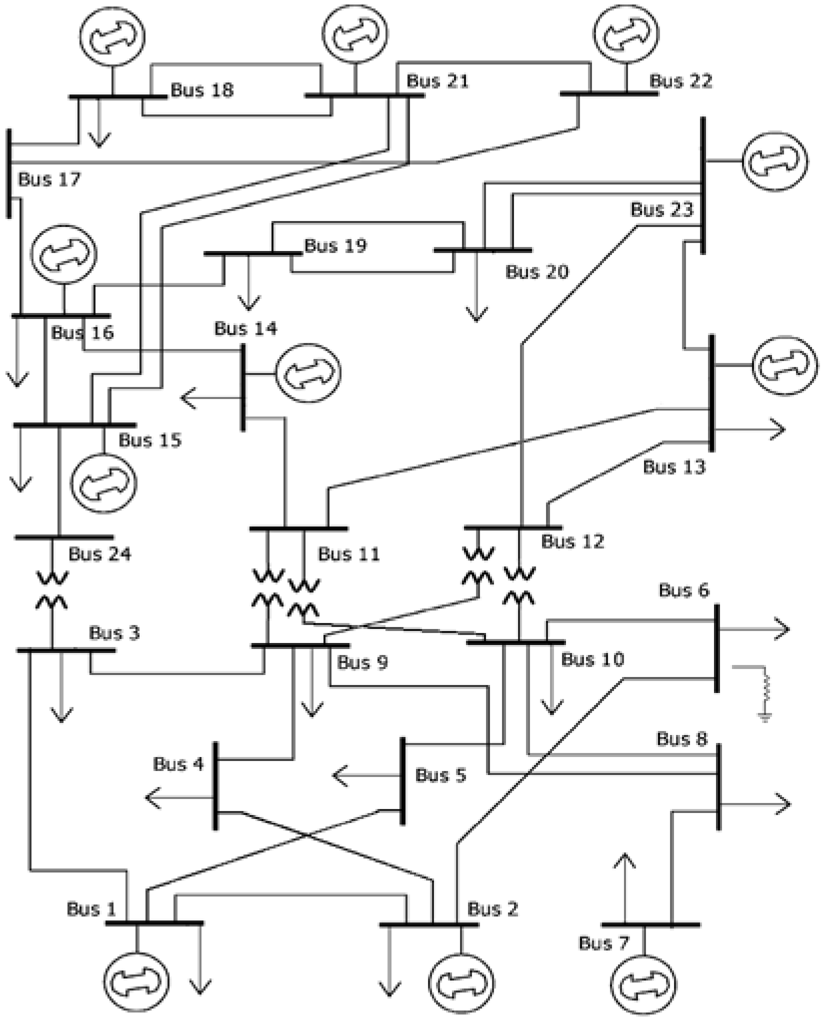


Fig. 5.1 – IEEE one area reliability test system 24 bus [16]

Figure 5.1 represents a transmission power systems network with the following elements:

- ✓ 24 buses
- ✓ 33 lines
- ✓ 32 generators
- ✓ 1 synchronous condenser (bus 14)
- ✓ 5 transformer
- ✓ 17 loads

where bus 13 is considered as reference bus and the system MVA base is 100MVA. For this test system the voltage limits in each bus are 0.90 p.u. for the lower bound and 1.1 p.u. for the upper bound and the voltage angle limits are $-\boldsymbol{\pi}$ for the lower bound and $\boldsymbol{\pi}$ for the upper bound.

The data available for the reliability test system 24 bus includes the values for repair time and failure rate as well as other parameters, but does not include the historical data used to obtain them. Thus, some adaptations have been introduced in this test system to overcome the lack of historical data information essential for the proposed methodology.

Those adaptations are:

- ✓ Specify the number of reparable outages for each component of the system (lines, cables, transformers and generators) for a time period of 10 years;
- ✓ Specify the repair times for each reparable outage.

These adaptations led to the creation of a data base, which can be found in annex 3.

Tables 5.1 and 5.2 show the identification numbers assigned to the system components and a summary of the transmission line and transformers data, respectively.

Table 5.1. Component identification numbers

Component	From Bus	To Bus	Component Number
Transmission Cable	1	2	1
Transmission Line	1	3	2
Transmission Line	1	5	3
Transmission Line	2	4	4
Transmission Line	2	6	5
Transmission Line	3	9	6
Transmission Transformer	3	24	7
Transmission Line	4	9	8
Transmission Line	5	10	9
Transmission Cable	6	10	10
Transmission Line	7	8	11
Transmission Line	8	9	12
Transmission Line	8	10	13
Transmission Transformer	9	11	14
Transmission Transformer	9	12	15
Transmission Transformer	10	11	16
Transmission Transformer	10	12	17
Transmission Line	11	13	18
Transmission Line	11	14	19
Transmission Line	12	13	20
Transmission Line	12	23	21
Transmission Line	13	23	22
Transmission Line	14	16	23
Transmission Line	15	16	24
Transmission Line	15	21	25
Transmission Line	15	21	26
Transmission Line	15	24	27
Transmission Line	16	17	28
Transmission Line	16	19	29
Transmission Line	17	18	30
Transmission Line	17	22	31
Transmission Line	18	21	32
Transmission Line	18	21	33
Transmission Line	19	20	34
Transmission Line	19	20	35
Transmission Line	20	23	36
Transmission Line	20	23	37
Transmission Line	21	22	38
Generator (20MW)	1	-	39
Generator (20MW)	1	-	40
Generator (76MW)	1	-	41
Generator (76MW)	1	-	42
Generator (20MW)	2	-	43
Generator (20MW)	2	-	44
Generator (76MW)	2	-	45
Generator (76MW)	2	-	46
Generator (100MW)	7	-	47
Generator (100MW)	7	-	48
Generator (100MW)	7	-	49
Generator (197MW)	13	-	50
Generator (197MW)	13	-	51
Generator (197MW)	13	-	52
Generator (Sync. Cond.)	14	-	53
Generator (12MW)	15	-	54
Generator (12MW)	15	-	55
Generator (12MW)	15	-	56

Generator (12MW)	15	-	57
Generator (12MW)	15	-	58
Generator (155MW)	15	-	59
Generator (155MW)	16	-	60
Generator (400MW)	18	-	61
Generator (400MW)	21	-	62
Generator (50MW)	22	-	63
Generator (50MW)	22	-	64
Generator (50MW)	22	-	65
Generator (50MW)	22	-	66
Generator (50MW)	22	-	67
Generator (50MW)	22	-	68
Generator (155MW)	23	-	69
Generator (155MW)	23	-	70
Generator (350MW)	23	-	71

Table 5.2 – Transmission line/transformer data

Component Number	From Bus	To Bus	Length (miles)	R (pu)	X (pu)	B (pu)	Limit (MVA)
1	1	2	3	0.003	0.014	0.461	175
2	1	3	55	0.055	0.211	0.057	175
3	1	5	22	0.022	0.085	0.023	175
4	2	4	33	0.033	0.127	0.034	175
5	2	6	50	0.050	0.192	0.052	175
6	3	9	31	0.031	0.119	0.032	175
7	3	24	0	0.002	0.084	0	400
8	4	9	27	0.027	0.104	0.028	175
9	5	10	23	0.023	0.088	0.024	175
10	6	10	16	0.014	0.061	2.459	175
11	7	8	16	0.016	0.061	0.017	175
12	8	9	43	0.043	0.165	0.045	175
13	8	10	43	0.043	0.165	0.045	175
14	9	11	0	0.002	0.084	0	400
15	9	12	0	0.002	0.084	0	400
16	10	11	0	0.002	0.084	0	400
17	10	12	0	0.002	0.084	0	400
18	11	13	33	0.006	0.048	0.100	500
19	11	14	29	0.005	0.042	0.088	500
20	12	13	33	0.006	0.048	0.100	500
21	12	23	67	0.012	0.097	0.203	500
22	13	23	60	0.011	0.087	0.182	500
23	14	16	27	0.005	0.059	0.082	500
24	15	16	12	0.002	0.017	0.036	500
25	15	21	34	0.006	0.049	0.103	500
26	15	21	34	0.006	0.049	0.103	500
27	15	24	36	0.007	0.052	0.109	500
28	16	17	18	0.003	0.026	0.055	500
29	16	19	16	0.003	0.023	0.049	500
30	17	18	10	0.002	0.014	0.030	500
31	17	22	73	0.014	0.105	0.221	500
32	18	21	18	0.003	0.026	0.055	500
33	18	21	18	0.003	0.026	0.055	500
34	19	20	27.5	0.005	0.040	0.083	500
35	19	20	27.5	0.005	0.040	0.083	500
36	20	23	15	0.003	0.022	0.046	500
37	20	23	15	0.003	0.022	0.046	500
38	21	22	47	0.009	0.068	0.142	500

Tables 5.3 and 5.4 provide, respectively, the values of loads in the buses and active and reactive power limits for each generator

Table 5.3 –Load data

Bus number	**Load**	
	MW	**MVar**
1	108	22
2	97	20
3	180	37
4	74	15
5	71	14
6	136	28
7	125	25
8	171	35
9	175	36
10	195	40
13	265	54
14	194	39
15	317	64
16	100	20
18	333	68
19	181	37
20	128	26
Total	2850	580

Table 5.4 – Active and reactive power limits for each generator

Bus number	**Component Number**	**Generators Active Power Limits (MVA)**		**Generators Reactive Power Limits (MVAr)**	
		Min	**Max**	**Min**	**Max**
1	39	16	20	0	10
	40	16	20	0	10
	41	15.2	76	-25	30
	42	15.2	76	-25	30
2	43	16	20	0	10
	44	16	20	0	10
	45	15.2	76	-25	30
	46	15.2	76	-25	30
7	47	25	100	0	60
	48	25	100	0	60
	49	25	100	0	60
13	50	69	197	0	80
	51	69	197	0	80
	52	69	197	0	80
14	53	0	0	-50	200
15	54	2.4	12	0	6
	55	2.4	12	0	6
	56	2.4	12	0	6
	57	2.4	12	0	6
	58	2.4	12	0	6
	59	54.3	155	-50	80
16	60	54.3	155	-50	80
18	61	100	400	-50	200
21	62	100	400	-50	200
22	63	10	50	-10	16
	64	10	50	-10	16

	65	10	50	-10	16
	66	10	50	-10	16
	67	10	50	-10	16
	68	10	50	-10	16
23	69	54.3	155	-50	80
	70	54.3	155	-50	80
	71	140	350	-25	150

Table 5.5 depicts the estimated values for the mean repair time ($\boldsymbol{r}$), the mean failure frequency ($\boldsymbol{f}$) as well as the cost to reduce $\boldsymbol{r}$ and $\boldsymbol{f}$ for each system component. For instance, for component 1 to reduce the failure rate in 0.1 would be necessary to spend 250 m.u. ($\mathbf{0.1 \times 2500 = 250\,m.u.}$).

The values for the forced average disconnection time and failure frequency were obtained by equations 3.1 and 3.14 using th historical data included in annex 3.

Table 5.5 – $\boldsymbol{r}$, $\boldsymbol{f}$, and cost to reduce $\boldsymbol{r}$ and $\boldsymbol{f}$ for each component

Component Number	Mean Repair Time $\boldsymbol{r}$ (Hours/Failure)	Mean Failure Frequency $\boldsymbol{f}$ (Failures/Year)	$\boldsymbol{C_{\Delta\lambda}}$ (m.u.)	$\boldsymbol{C_{\Delta r}}$ (m.u.)
1	16	0.3	2500	110
2	10	0.5	1200	70
3	10	0.3	1000	50
4	10	0.4	1010	55
5	10	0.5	1150	68
6	10	0.4	1010	55
7	768	0.2	3000	150
8	10	0.4	1000	45
9	10	0.3	1000	35
10	35	0.3	3500	170
11	10	0.3	980	20
12	10	0.4	1100	35
13	10	0.4	1100	35
14	768	0.2	3000	150
15	768	0.2	3000	150
16	768	0.2	3000	150
17	768	0.2	3000	150
18	11	0.4	1150	45
19	11	0.4	1150	45
20	11	0.4	1150	45
21	11	0.5	2100	55
22	11	0.5	2000	50
23	11	0.4	1100	40
24	11	0.3	1100	35
25	11	0.4	1150	45
26	11	0.4	1150	45
27	11	0.4	1200	40
28	11	0.3	1100	40
29	11	0.3	1100	40
30	11	0.3	1000	30
31	11	0.5	2900	60
32	11	0.4	1100	40
33	11	0.4	1100	40
34	11	0.4	1100	35

35	11	0.4	1100	35
36	11	0.3	1050	25
37	11	0.3	1050	25
38	11	0.5	1200	40
39	50	17.5	5700	200
40	50	17.5	5700	200
41	40	4.4	5900	170
42	40	4.4	5900	170
43	50	17.5	5700	200
44	50	17.5	5700	200
45	40	4.4	5900	170
46	40	4.4	5900	170
47	50	7.0	6200	230
48	50	7.0	6200	230
49	50	7.0	6200	230
50	50	8.8	6800	240
51	50	8.8	6800	240
52	50	8.8	6800	240
53	2.5	0.2	500	15
54	60	2.9	5500	230
55	60	2.9	5500	230
56	60	2.9	5500	230
57	60	2.9	5500	230
58	60	2.9	5500	230
59	40	8.8	6500	210
60	40	8.8	6500	210
61	150	7.0	10000	500
62	150	7.0	10000	500
63	20	4.4	8000	150
64	20	4.4	8000	150
65	20	4.4	8000	150
66	20	4.4	8000	150
67	20	4.4	8000	150
68	20	4.4	8000	150
69	40	8.8	6500	210
70	40	8.8	6500	210
71	100	7.0	7500	300

The next three figures (5.2, 5.3 and 5.4) depict a comparison between each component type (cables/lines, transformers and generators) for the means of repair time, failure rate and forced outage rate (FOR) parameters, respectively.

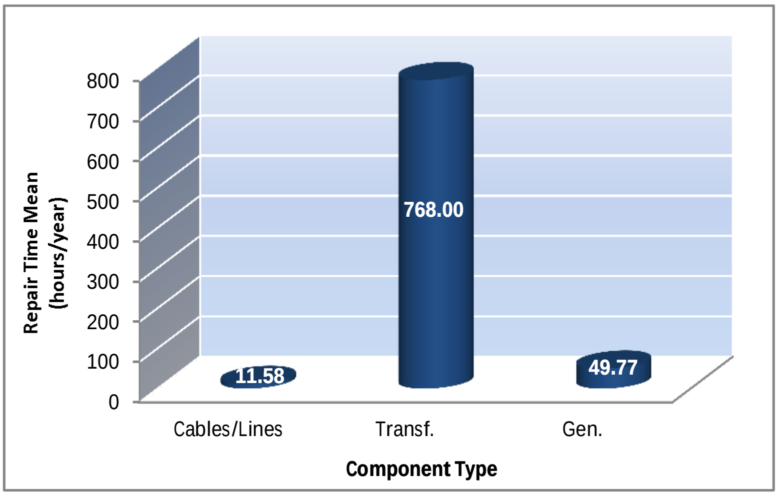


Fig. 5.2 – Mean repair time for each component type

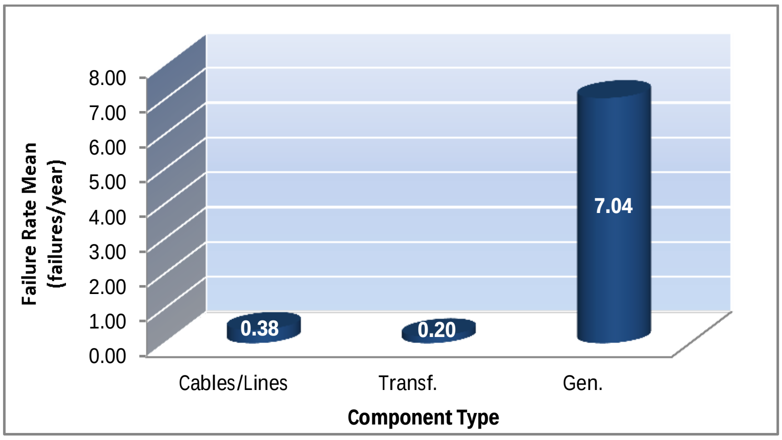


Fig. 5.3 – Mean failure rate mean for each component type

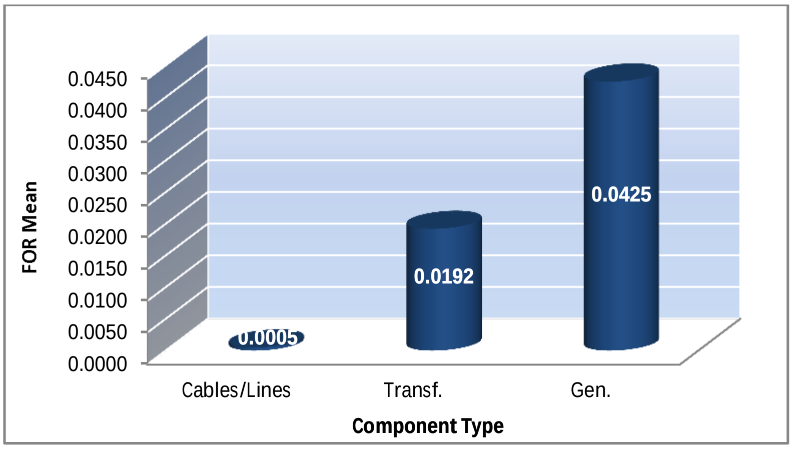


Fig. 5.4 – FOR mean for each component type

Analyzing these figures (5.2, 5.3 and 5.4) it is perfectly clear that generators present the highest failure probability of all components types, which is very evident in figure 5.4.

As a result, we can expect a great chance of generators hitting the down state as can be verified in section 5.3.

5.2 Fuzzy models creation

Using the equations 3.1 and 3.14 the fuzzy models for repair time and failure rate for each system component can be determined. The unavailability fuzzy model for each component can be calculated using the failure rate and repair time (equation 4.28). Figures 5.5a, 5.5b and 5.6, respectively, illustrate the models for repair time, failure rate and unavailability for component 1. The models for all components can be found in annexes 4, 5 and 6, respectively for repair time, failure rate and unavailability (failure probability). Table 5.6 presents the lower and upper bound for failure rate and repair times fuzzy models for each system component.

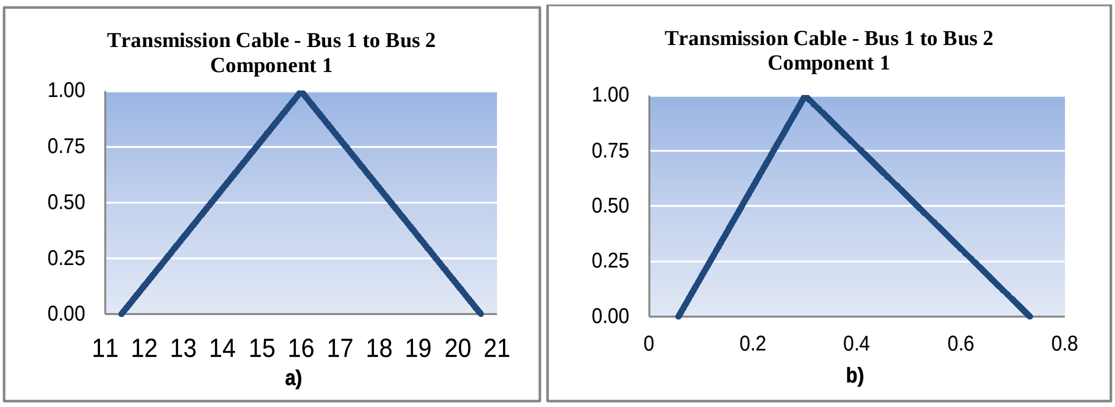


Fig. 5.5 – a) Repair time fuzzy model for component 1
b) Failure rate fuzzy model for component 1

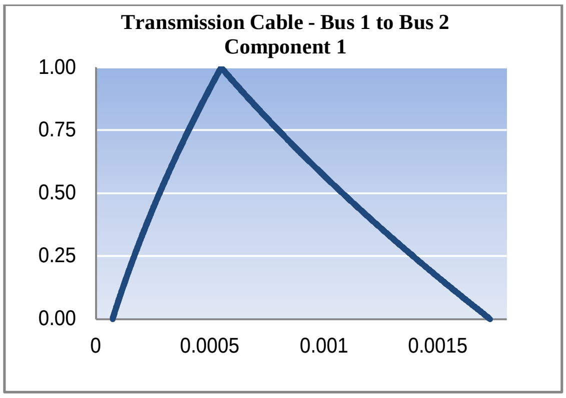


Fig. 5.6 – Unavailability fuzzy model for component 1

Table 5.6 – Lower and upper bounds for failure rate and repair time fuzzy models

Component Number	Lower Bound for Failure Rate	Upper Bound for Failure Rate	Lower Bound for Repair Time	Upper Bound for Repair Time
1	0.0558	0.7334	11.407	20.593
2	0.1537	1.0377	8.897	11.103
3	0.0558	0.7334	7.452	12.548
4	0.1015	0.8891	8.510	11.490
5	0.1537	1.0377	8.993	11.007
6	0.1015	0.8891	8.237	11.763
7	0.0199	0.5713	754.968	781.032
8	0.1015	0.8891	8.846	11.154
9	0.0558	0.7334	7.794	12.206
10	0.0558	0.7336	28.259	41.741
11	0.0558	0.7334	8.726	11.274
12	0.1015	0.8891	8.116	11.884
13	0.1015	0.8891	8.846	11.154
14	0.0199	0.5713	741.936	794.064
15	0.0199	0.5713	754.968	781.032
16	0.0199	0.5713	741.936	794.064
17	0.0199	0.5713	741.936	794.064
18	0.1015	0.8891	5.882	16.118
19	0.1015	0.8891	9.116	12.884
20	0.1015	0.8891	10.147	11.853
21	0.1537	1.0377	10.280	11.720
22	0.1537	1.0377	10.550	11.450
23	0.1015	0.8891	10.334	11.666
24	0.0558	0.7334	8.794	13.206
25	0.1015	0.8891	10.733	11.267
26	0.1015	0.8891	10.334	11.666
27	0.1015	0.8891	9.667	12.333
28	0.0558	0.7334	8.779	13.221
29	0.0558	0.7334	8.794	13.206
30	0.0558	0.7334	9.726	12.274
31	0.1537	1.0377	10.640	11.360
32	0.1015	0.8891	9.510	12.490
33	0.1015	0.8891	9.667	12.333
34	0.1015	0.8891	10.200	11.800
35	0.1015	0.8891	10.467	11.533
36	0.0558	0.7334	5.696	16.304
37	0.0558	0.7334	8.452	13.548
38	0.1537	1.0377	9.993	12.007
39	14.9477	20.2666	49.665	50.335
40	14.9477	20.2666	49.664	50.336
41	3.1676	5.8304	39.644	40.356
42	3.1676	5.8304	39.664	40.336
43	14.9477	20.2666	49.632	50.368
44	14.9477	20.2666	49.648	50.352
45	3.1676	5.8304	39.643	40.357
46	3.1676	5.8304	39.715	40.285
47	5.4204	8.7818	49.672	50.328
48	5.4204	8.7818	49.625	50.375
49	5.4204	8.7818	49.618	50.382
50	7.0172	10.7871	49.730	50.270
51	7.0172	10.7871	49.687	50.313
52	7.0172	10.7871	49.756	50.244
53	0.0197	0.5664	2.484	15.516
54	1.9189	4.0790	59.439	60.561
55	1.9189	4.0790	59.419	60.581

56	1.9189	4.0790	59.511	60.489
57	1.9189	4.0790	59.489	60.511
58	1.9189	4.0790	59.410	60.590
59	7.0164	10.7859	39.777	40.223
60	7.0164	10.7859	39.772	40.228
61	5.4266	8.7919	149.616	150.384
62	5.4266	8.7919	149.623	150.377
63	2.9976	5.5983	19.607	20.393
64	2.9976	5.5983	19.607	20.393
65	2.9976	5.5983	19.588	20.412
66	2.9976	5.5983	19.588	20.412
67	2.9976	5.5983	19.594	20.406
68	2.9976	5.5983	19.647	20.353
69	7.0164	10.7859	39.767	40.233
70	7.0164	10.7859	39.792	40.208
71	5.4235	8.7868	99.664	100.336

5.3 Monte Carlo simulation

A Nonsequential sampling MCS has been applied to obtain the system states. The method exposed in sub-section 4.1.2 is used as a convergence method of MCS. $\boldsymbol{Q}$ is the system probability of having at least one component in down state. It is used $\mathbf{3.40} \times \mathbf{10^{-4}}$ as a desired accuracy level $(\boldsymbol{\beta})$. This value of accuracy level leads to 4,000,000 cycles in MCS process. Figure 5.7 present the evolution of MCS. The Monte Carlo simulation is a fluctuating process, and as we can see, this statement is very evident in figure 5.7.

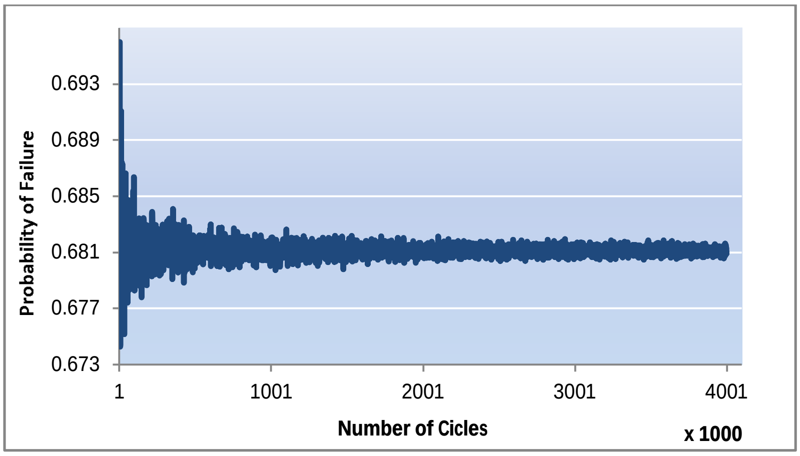


Fig. 5.7 – MCS evolution for failure states

As a result of the MCS, 42556 different system states were obtained. One of this sates is a state for which there is not any failure, thus we have 42555 different system states with components in down state. Table 5.7 shows the number of occurrences for each state and probability range, considering only the states that have components in down state. For instance, 42538 system states have a number of occurrences in MCS process between 1 and 19999 and a probability of occurrence in percentage between 0.000025 and 0.499975. The information in the table 5.7 allows the utility to conclude that most the system states have an occurrence probability that can vary between 0.000025 % and 0.499975 %.

Table 5.7 – Number of states for each state occurrences and probability range

State occurrences	Probability (%)	Number of States
1-19999	0.000025 – 0.499975	42538
20000-39999	0.500000 – 0.999975	0
40000-59999	1.000000 – 1.499975	10
60000-79999	1.500000 – 1.999975	0
80000-99999	2.000000 – 2.499975	1
100000-120000	2.500000 – 2.999975	4
>120000	3.000000	2

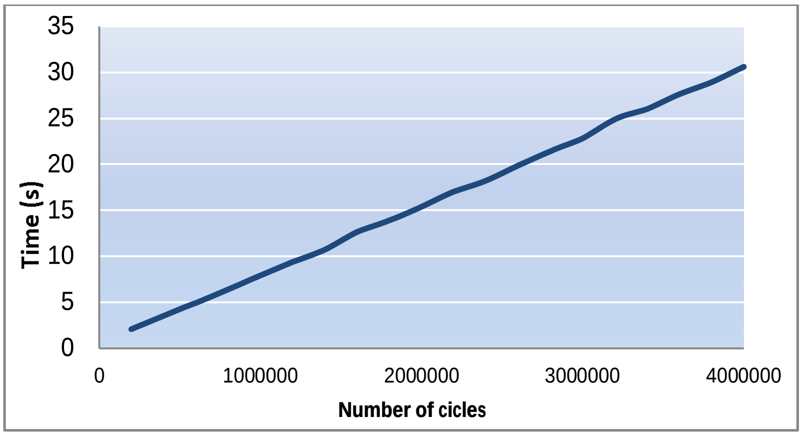


Fig. 5.8 – Time evolution for MCS cycles

Performing the MCS 4,000,000 cycles took a little more than 30 seconds, as we can see in figure 5.8. This figure depicts the time evolution for the MCS and it is quite evident an evolution in time that is almost linear with the increase of number of cycles. This evolution is a good indicator of the effectiveness of the MCS algorithm implemented in this thesis.

The next figures (5.9 to 5.12) show some results and considerations about the MCS process. Figures 5.9 and 5.10 depict, respectively, the probability of occurrence of each component in MCS process and the percentage of occurrences for each component type.

The higher occurrence probability of generators it is obvious, as expected (higher failure probability of all components types, as previously referred and can be observed in figure 5.4).

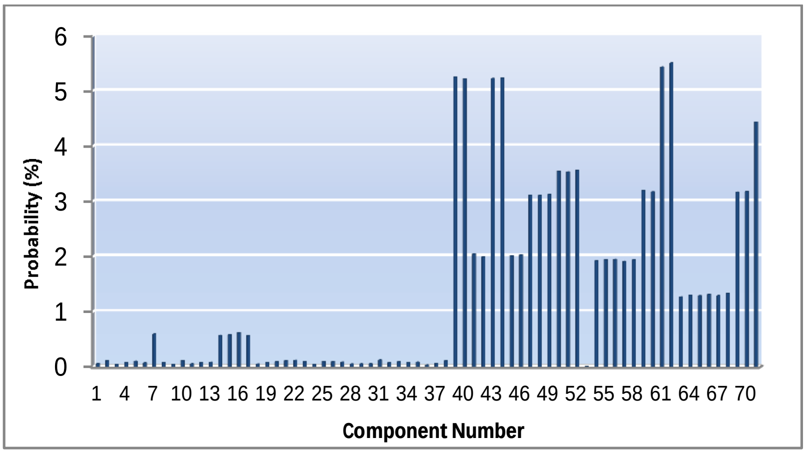


Fig. 5.9 – Component failure probability

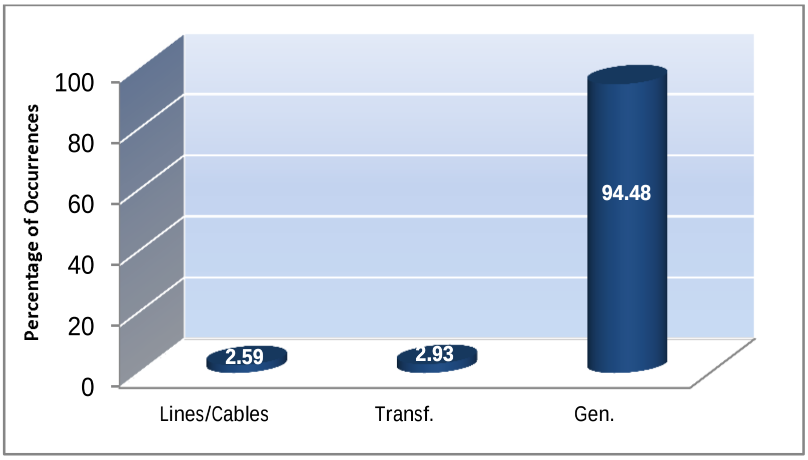


Fig. 5.10 – Percentage of occurrences for each component type

Figure 5.11 illustrates the probability of number of components in down state in all systems states obtained by the MCS. This probability has been obtained using the following equation:

$$\boldsymbol{Prob_s} = \frac{\sum_{i=1}^{n} \boldsymbol{m_i}}{\boldsymbol{N}} \qquad 5.1$$

where $\boldsymbol{Prob_s}$ is the probability of states that have $\boldsymbol{s}$ components in down state, $\boldsymbol{n}$ the number of states that have $\boldsymbol{s}$ components in down state, $\boldsymbol{m_i}$ is the number of occurrences for state $\boldsymbol{i}$ in the MCS and $\boldsymbol{N}$ is the number of MCS cycles for $\boldsymbol{3.40 \times 10^{-4}}$ of accuracy level

It is important to note that equation 5.1 is valid only if the number of samples in the MCS is sufficiently large. In this study the number of samples for the desire accuracy level is 4,000,000. This sample is considered a large sample.

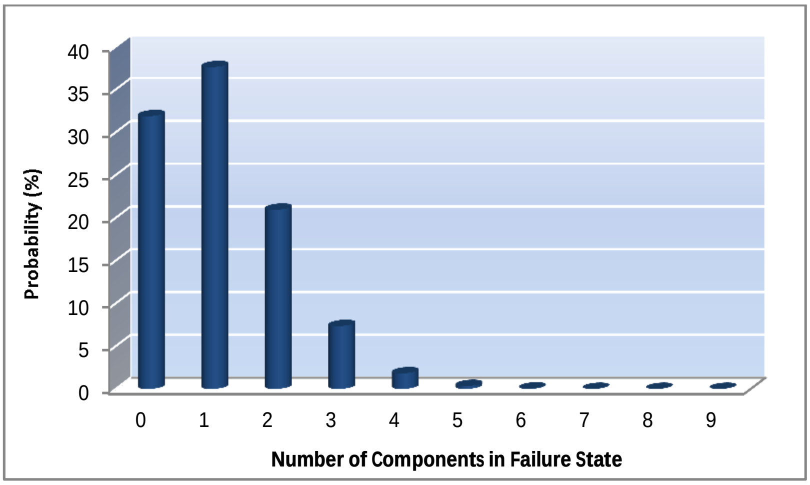


Fig. 5.11 – Probability of number of components in failure state

Figure 5.12 shows the number of distinct states for each amount of components in down state. It is evident, through this figure, that the states that have four components in down state is the kind of state that occurs more times in MCS process, around 19,000 times.

Comparing figures 5.11 and 5.12 we can see, for example, that the probability of four components in down state is around 2%. It is important to note that this kind of state (four components in down state) has the highest number of occurrences (see figure 5.12), but this is not synonymous of having the highest probability (see figure 5.11).

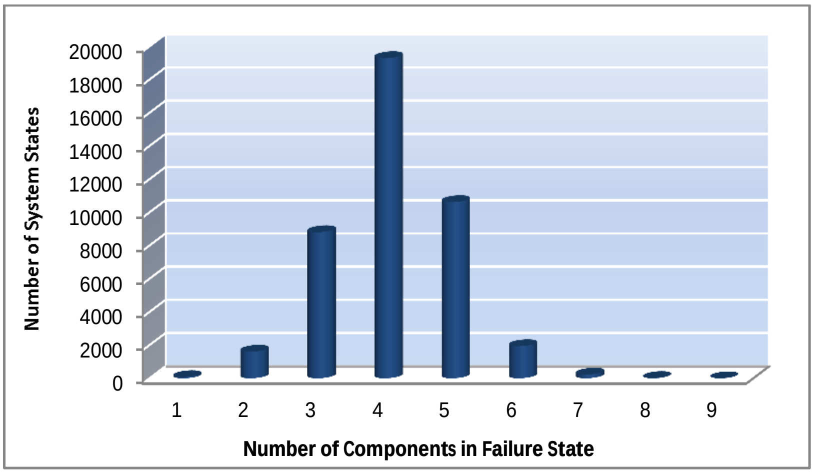


Fig. 5.12 – Number of states for each amount of components in down state

5.4 System contingencies

MCS processes 42,555 different systems states with components in down state. For these states the line flows and bus voltages are calculated and situations with overloading and/or voltage violation are identified using an AC Power Flow analysis.

The identification of the states and what kind of problems (overloading or voltage violation) they can have are listed in annex 7. The numbers of occurrences for each problem identified by contingency analysis are expressed in figure 5.13.

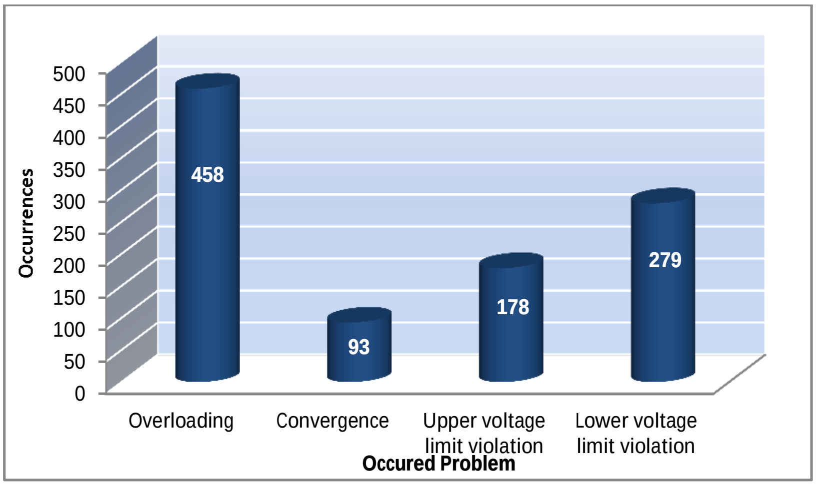


Fig. 5.13 – Problems type

The numbers of occurrences of states with overloading problems and voltage problems are practically the same, with 458 occurrences for overloading and 457 for voltage limits violations, considering both the upper and lower voltage violation (178+279).

It is important to note that one state accounts for all the occurred problems it presents, so it can be included in more than one bar of figure 5.13. In this study, there are 1001 different states whereas the total number of occurred problems is 1008 (as can be verified by adding the number of registered problems for each bar in figure 5.13).

In this contingency analysis 93 occurrences present convergence problems.

5.5 Remedial actions

The contingency analysis obtained 1001 states that cause problems in the system. For these states the optimal power flow model is used to reschedule generations and alleviate constraints violations and, at same time, minimize the total load curtailment. The optimal power flow model shows that there are 710 states with load curtailment. Annex 8 lists the values of load curtailed in each bus in each of these 710 states. Figure 5.14 presents the quantity of occurrences for each action taken in the remedial actions process. We can easily verify that most of states that contingencies analysis process indicates as problematic states lead to load curtailment. Only in 291 states the re-dispatch may solve the problem found by the contingencies analysis process.

In this remedial action algorithm, based on optimal power flow, 53 states that conduct to an unfeasible solution were obtained. Thus, the inductance of 100MW was used in bus 6, allowing reducing the 53 impossible solutions to only 4 (states P795, P828, P833 and P856). After analyzing the results obtained of these four states, it was found that the voltage lower bound needed to be reduced to 0.8999 p.u. in order to obtain a feasible solution in these four states.

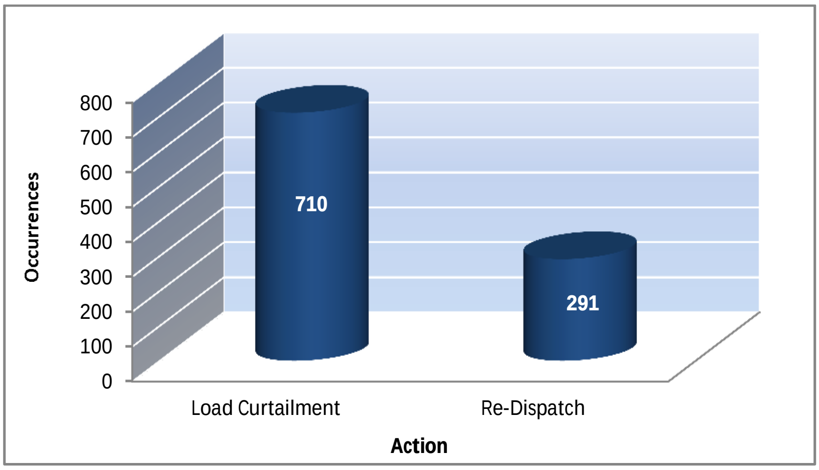


Fig. 5.14 – Number of occurrences for each action

The next figures (5.15 and 5.16) presents the active load curtailment and reactive load curtailment for the states that have a number of occurrences greater than or equal to four. It is easy to see that the states with IDs P77, P78 and P81 are the states that lead to higher values of active load curtailment, with 9.32, 9.20 and 8.45 p.u. and states with

IDs P23 and P65 lead to higher values of reactive load curtailment, with 1.12 and 1.03 p.u.

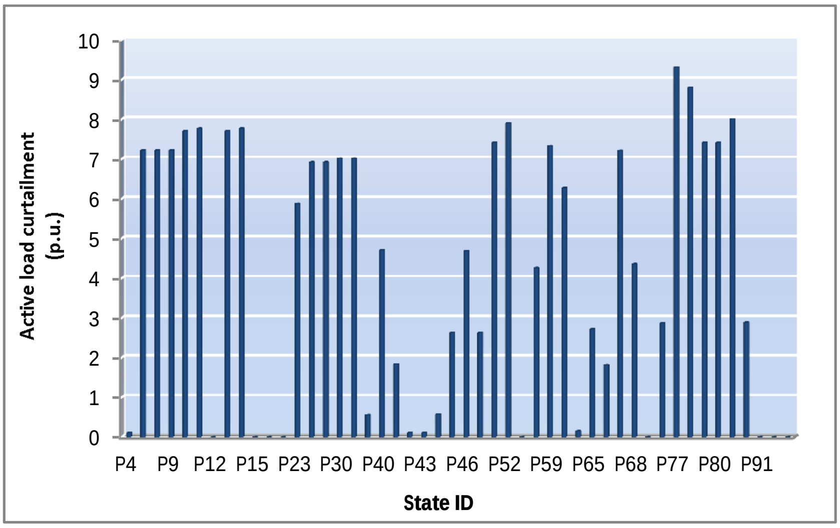


Fig. 5.15 – Active load curtailment

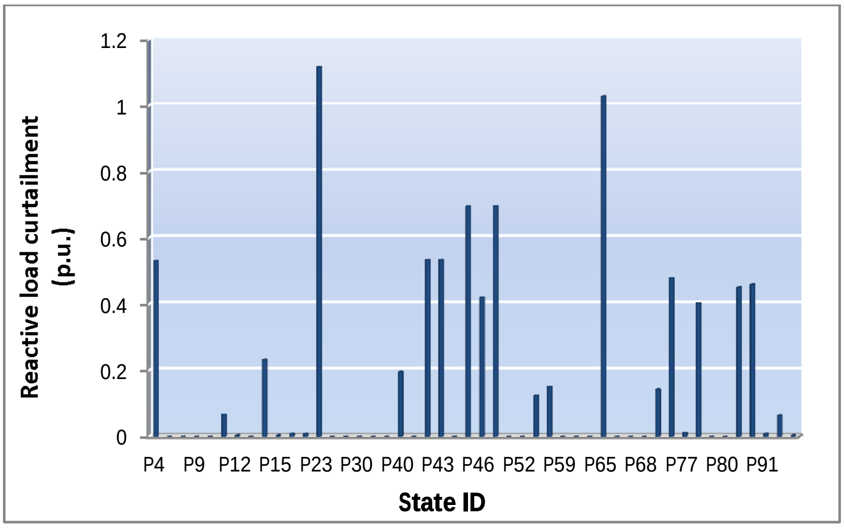


Fig. 5.16 – Reactive load curtailment

5.6 Probability reduction for states that cause load curtailment

As already referred, the OPF model indicates the existence of 710 states that cause load curtailment. For each of these states a mathematical model (see section 4.3) which objective is to reduce the probability of occurrence of the states that cause load curtailment while minimizing the costs to achieve that reduction will be applied.

In this study it is proposed to obtain 15% of reduction for the failure probability of each component in down state belonging to the states that cause load curtailment. The values for $\Delta \boldsymbol{r}_{\boldsymbol{i}}^{\boldsymbol{min}}$ and $\Delta \boldsymbol{\lambda}_{\boldsymbol{i}}^{\boldsymbol{min}}$ are zero and for $\Delta \boldsymbol{r}_{\boldsymbol{i}}^{\boldsymbol{max}}$ and $\Delta \boldsymbol{\lambda}_{\boldsymbol{i}}^{\boldsymbol{max}}$ (see sub-section 4.3) are 50% of $\boldsymbol{i}$ fuzzy set lower bound, where $\boldsymbol{i}$ is the system component.

A new MCS process is applied individually for each state that causes load curtailment (710 MCS processes). Thus, it is possible to verify and prove the probability reduction of each system state.

It can be seen through annexes 9 (investment in order to reduce the failure probability acting in failure rate and repair time) and 10 (investment in order to reduce the failure probability acting only in repair time) that if the number of occurrences is lower than four the approach to reduce the occurrence probability of states that cause load curtailment could not be applied. It is not possible to get a reduction in the number of occurrences and, consequently, a probability occurrence reduction in a state that has already a very small number of occurrences. Thus, only the first 48 states, i.e., states with four or more occurrences are considered for the undertaken study.

In this section two approaches will be used:

a) Act in Repair Time and in Failure Rate;
b) Act in Repair Time only.

Act in Repair Time and in Failure Rate

In this approach it is considered that it is possible to act in failure rate and in the repair time parameters, i.e., to reduce one or both parameters.

Table 5.8 show the number of occurrences and the occurrence probability of the state before and after investment (cost of reduction in repair time and failure rate for the states that have four or more occurrences) as well as the cost in m.u. of that investment. Figures 5.17 and 5.18 present respectively, a comparison between the number of occurrences and state probability occurrence before and after investment. From these figures, it is very clear the reduction of the number of occurrences and consequently the occurrence probability of the state. With only 15% of reduction in failure probability of each component in down state, it can be obtained a reduction of around 50% in the probability of some states that cause load curtailment (for instance in state P4).

Table 5.8 – Probability occurrence reduction considering repair time and failure rate variations

ID	Before Investment		State Probability Occurrence (%)	After Investment		State Probability Occurrence (%)	Cost (m.u.)	Load Curtailment (p.u.)
	State Position	Occurrences		State Position	Occurrences			
P4	2357	41	0.001025	3451	21	0.000525	5175.00	0.6359
P5	2533	35	0.000875	4327	14	0.000350	27261.02	7.2180
P6	2538	35	0.000875	3985	16	0.000400	27261.02	7.2180
P9	2846	29	0.000725	5071	11	0.000275	27261.02	7.2180
P10	2963	27	0.000675	4292	14	0.000350	26796.02	7.7037
P11	2965	27	0.000675	4119	15	0.000375	26796.02	7.8346
P12	3038	27	0.000675	5889	10	0.000250	1937.16	0.0035
P13	3127	25	0.000625	4000	16	0.000400	26796.02	7.7037
P14	3129	25	0.000625	4128	15	0.000375	26796.02	8.0036
P15	3219	25	0.000625	6318	9	0.000225	1937.16	0.0035
P17	3506	22	0.000550	6867	8	0.000200	1937.16	0.0089
P19	3871	19	0.000475	5898	10	0.000250	1937.16	0.0089
P23	4177	16	0.000400	10710	3	0.000075	23556.02	6.9916
P25	4624	14	0.000350	5748	9	0.000225	26556.02	6.9231
P29	4864	13	0.000325	7406	6	0.000150	26556.02	6.9231
P30	4915	13	0.000325	9848	4	0.000100	26556.02	7.0134
P34	5478	11	0.000275	6902	7	0.000175	26556.02	7.0134
P38	5984	10	0.000250	9409	5	0.000125	10548.01	0.5550
P40	6037	9	0.000225	9318	4	0.000100	15918.01	4.8984
P41	6079	9	0.000225	21384	1	0.000025	15693.01	1.8287
P42	6246	9	0.000225	28939	1	0.000025	6675.00	0.6409
P43	6314	9	0.000225	32182	1	0.000025	6675.00	0.6409
P44	6411	9	0.000225	10988	4	0.000100	10548.01	0.5713
P45	6412	9	0.000225	9454	5	0.000125	1530.00	3.3189
P46	6497	8	0.000200	11008	3	0.000075	15918.01	5.0998
P47	6938	8	0.000200	13733	3	0.000075	1530.00	3.3189
P51	7148	7	0.000175	0	0	0.000000	28761.02	7.4119
P52	7404	7	0.000175	0	0	0.000000	31680.02	7.8990
P56	7618	7	0.000175	40955	1	0.000025	1457.16	0.1232
P57	7736	6	0.000150	7320	6	0.000150	13284.00	4.4097
P59	8260	6	0.000150	0	0	0.000000	28761.02	7.3282
P60	8404	6	0.000150	0	0	0.000000	37168.29	6.2723
P61	8469	6	0.000150	9453	5	0.000125	4530.00	0.1490
P65	8615	5	0.000125	13803	2	0.000050	6660.00	3.7444
P66	8710	5	0.000125	8285	5	0.000125	15693.01	1.8125
P67	8938	5	0.000125	0	0	0.000000	30931.80	7.2088
P68	9545	5	0.000125	38705	1	0.000025	23264.53	4.3573
P72	9588	5	0.000125	19227	2	0.000050	1457.16	0.1427
P73	9621	5	0.000125	18780	2	0.000050	21122.28	3.3435
P77	9657	4	0.000100	0	0	0.000000	31440.02	9.3200
P78	9850	4	0.000100	0	0	0.000000	28521.02	9.1988

P79	10221	4	0.000100	14820	2	0.000050	28761.02	7.4119
P80	10236	4	0.000100	11507	3	0.000075	28761.02	7.4119
P81	10712	4	0.000100	0	0	0.000000	31680.02	8.4544
P86	11180	4	0.000100	40755	1	0.000025	1755.00	3.3440
P91	11185	4	0.000100	0	0	0.000000	6437.16	0.0089
P92	11186	4	0.000100	40091	1	0.000025	3437.16	0.0641
P93	11187	4	0.000100	40073	1	0.000025	3197.16	0.0035

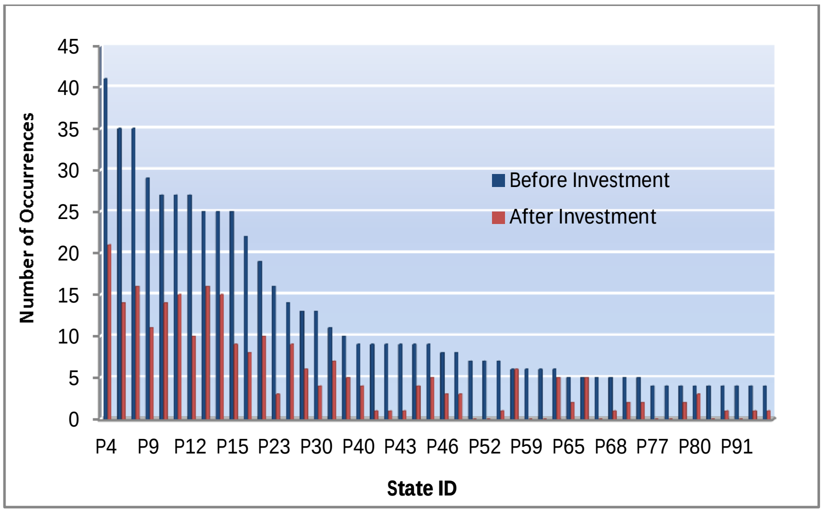


Fig. 5.17 – Number of occurrences before and after investment considering repair time and failure rate variations

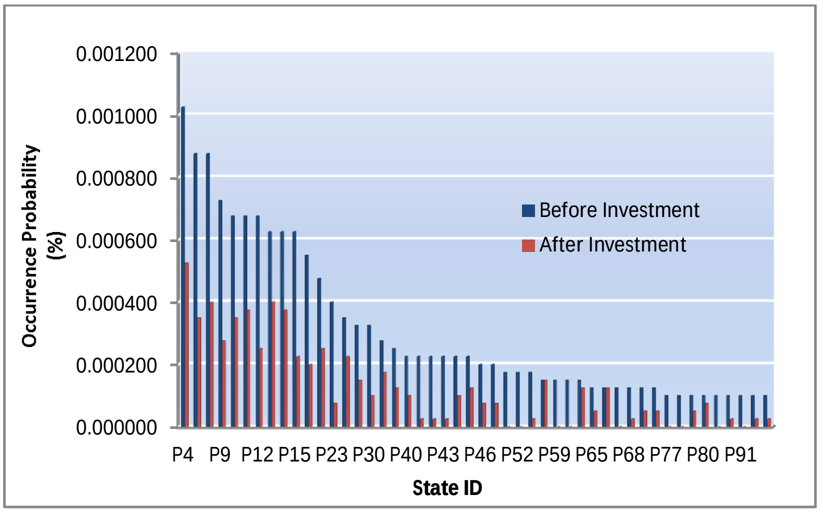


Fig. 5.18 – Occurrence probability before and after investment considering repair time and failure rate variations

Act in Repair Time only

In this approach it is considered that it is more practicable to reduce the repair time only. This reduction can be obtained by increasing operation personnel, upgrading the automation system, etc. Thus, a reduced optimization problem (from the problem exposed in section 4.3) can be formulated without considering the failure rate reduction ($\Delta\boldsymbol{\lambda}$).

Table 5.9 shows the number of occurrences and the occurrence probability of the state before and after investment (cost of reduction in repair time for the states that have four or more occurrences) as well as the cost in m.u. of that investment.

Table 5.9 – Probability occurrence reduction considering only repair time variation

ID	Before Investment		State Probability Occurrence (%)	After Investment		State Probability Occurrence (%)	Cost (m.u.)	Load Curtailment (p.u.)
	State Position	Occurrences		State Position	Occurrences			
P4	2357	41	0.001025	3451	21	0.000525	5175.00	0.6359
P5	2533	35	0.000875	3855	17	0.000425	28725.00	7.2180
P6	2538	35	0.000875	3915	17	0.000425	28725.00	7.2180
P9	2846	29	0.000725	4837	12	0.000300	28725.00	7.2180
P10	2963	27	0.000675	4153	15	0.000375	28260.00	7.7037
P11	2965	27	0.000675	4163	15	0.000375	28260.00	7.8346
P12	3038	27	0.000675	4108	17	0.000425	2392.50	0.0035
P13	3127	25	0.000625	3889	17	0.000425	28260.00	7.7037
P14	3129	25	0.000625	3998	16	0.000400	28260.00	8.0036
P15	3219	25	0.000625	5530	11	0.000275	2392.50	0.0035
P17	3506	22	0.000550	4702	14	0.000350	2392.50	0.0089
P19	3871	19	0.000475	4492	15	0.000375	2392.50	0.0089
P23	4177	16	0.000400	8126	5	0.000125	25020.00	6.9916
P25	4624	14	0.000350	5808	9	0.000225	28020.00	6.9231
P29	4864	13	0.000325	7463	6	0.000150	28020.00	6.9231
P30	4915	13	0.000325	9924	4	0.000100	28020.00	7.0134
P34	5478	11	0.000275	6938	7	0.000175	28020.00	7.0134
P38	5984	10	0.000250	8287	6	0.000150	11280.00	0.5550
P40	6037	9	0.000225	7353	6	0.000150	16650.00	4.8984
P41	6079	9	0.000225	21486	1	0.000025	16425.00	1.8287
P42	6246	9	0.000225	28939	1	0.000025	6675.00	0.6409
P43	6314	9	0.000225	32182	1	0.000025	6675.00	0.6409
P44	6411	9	0.000225	11016	4	0.000100	11280.00	0.5713
P45	6412	9	0.000225	9454	5	0.000125	1530.00	3.3189
P46	6497	8	0.000200	11052	3	0.000075	16650.00	5.0998
P47	6938	8	0.000200	13733	3	0.000075	1530.00	3.3189
P51	7148	7	0.000175	0	0	0.000000	30225.00	7.4119
P52	7404	7	0.000175	0	0	0.000000	29760.00	7.8990
P56	7618	7	0.000175	40991	1	0.000025	1912.50	0.1232
P57	7736	6	0.000150	7340	6	0.000150	9900.00	4.4097
P59	8260	6	0.000150	31261	1	0.000025	30225.00	7.3282
P60	8404	6	0.000150	37007	1	0.000025	44280.00	6.2723
P61	8469	6	0.000150	9453	5	0.000125	4530.00	0.1490
P65	8615	5	0.000125	13803	2	0.000050	6660.00	3.7444

P66	8710	5	0.000125	8319	5	0.000125	16425.00	1.8125
P67	8938	5	0.000125	0	0	0.000000	29520.00	7.2088
P68	9545	5	0.000125	9493	5	0.000125	34560.00	4.3573
P72	9588	5	0.000125	13784	3	0.000075	1912.50	0.1427
P73	9621	5	0.000125	18938	2	0.000050	22602.00	3.3435
P77	9657	4	0.000100	0	0	0.000000	29520.00	9.3200
P78	9850	4	0.000100	0	0	0.000000	29985.00	9.1988
P79	10221	4	0.000100	14915	2	0.000050	30225.00	7.4119
P80	10236	4	0.000100	11600	3	0.000075	30225.00	7.4119
P81	10712	4	0.000100	30709	1	0.000025	29760.00	8.4544
P86	11180	4	0.000100	40755	1	0.000025	1755.00	3.3440
P91	11185	4	0.000100	40161	1	0.000025	6892.50	0.0089
P92	11186	4	0.000100	40127	1	0.000025	3892.50	0.0641
P93	11187	4	0.000100	18835	2	0.000050	3652.50	0.0035

Figures 5.19 and 5.20 depict, respectively, the comparison between the number of occurrences and the occurrence probability of the state before and after investment. The reduction of the number occurrences and state probability occurrence is very clear in these two figures. With only 15% of reduction in failure probability of each component in down state, it can be obtained a reduction of around 50% in the probability of some states that cause load curtailment (for instance in state P4).

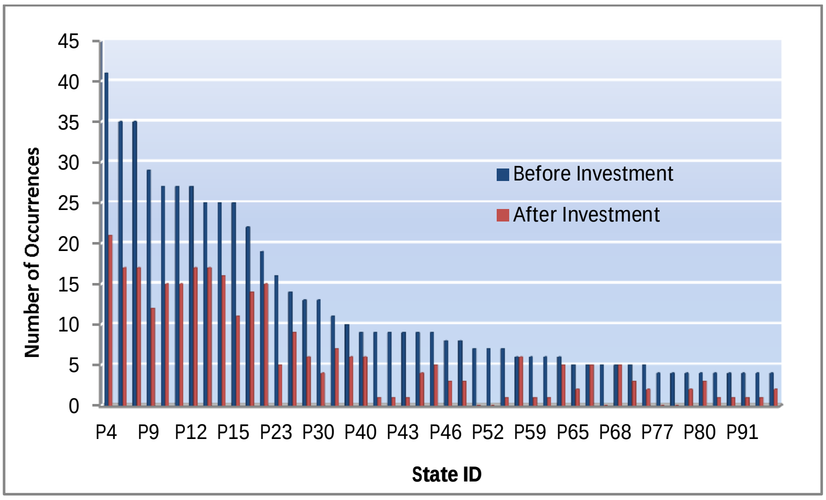


Fig. 5.19 – Number of occurrences before and after investment considering only repair time variation

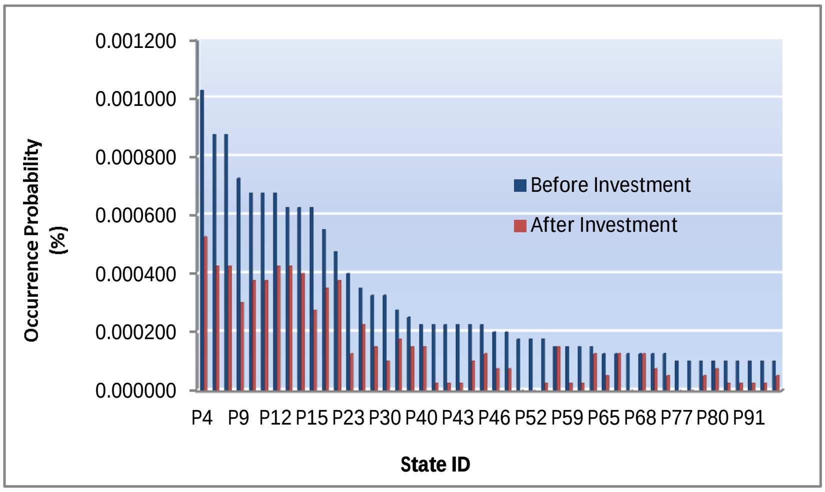


Fig. 5.20 – – Occurrence probability before and after investment considering only repair time variation

5.7 Conclusions

This chapter presents the case study to validate the proposed FMC-TRel methodology. The Reliability Test System 1996 IEEE 24 Bus has been chosen as a network test system.

Some adaptations have been introduced in this test system to overcome the lack of historical data information essential for the methodology presented in this thesis. There was the need to specify the number of reparable outages for each component of the system for a time period of 10 years and the repair times for each reparable outage.

A Nonsequential sampling Monte Carlo simulation has been applied to obtain the system states, with $\mathbf{3.40} \times \mathbf{10^{-4}}$ of accuracy level which leads to 4,000,000 cycles with 42,556 different system states. The Monte Carlo simulation process took a little more than 30 seconds to reach the desire accuracy level. It was quite evident that the states that have four components in down state is the type of state that occurs more times in MCS process, but this is not synonymous of having the highest probability.

The AC power flow analysis is used to identify situations with overloading and/or voltage violation. It was obtained 1001 states that cause problems in the system.

A remedial action algorithm based on optimal power flow shows that there are 710 states with load curtailment, 291 states for which re-dispatch solves the problem and 53 states with unfeasible solutions. For these 53 states it was used an inductance of

100MW in bus 6 which led to only 4 states with unfeasible solutions. After a carefully analysis of the results obtained for these 4 states, it has been concluded that it was necessary to reduce the voltage lower bound to 0.8999 p.u. to obtain a feasible solution.

An optimization model which objective is to reduce the failure probability of occurrence of the states that cause load curtailment while minimizing the total costs to achieve that reduction has been applied, where it is proposed to obtain 15% of reduction for the failure probability of each component in down state belonging to the states that cause load curtailment. Two approaches have been used (act in repair time and in failure rate and act in repair time only). It can be concluded that, with only 15% of reduction in failure probability of each component in down state, it can be obtained a reduction of around 50% in the probability of some states that cause load curtailment.

6 Conclusions and Future Work

Nowadays the concerns with power systems reliability are increasing and considerable efforts have been devoted to this issue. In power systems there are two types of uncertainties for component outage parameters: randomness and fuzziness uncertainties. Randomness can be described by a probabilistic model whereas fuzziness can be modeled by a fuzzy set representation. The fuzzy membership functions for the failure rate, repair time and unavailability are developed using statistical records. This thesis proposes a combined fuzzy-probabilistic modeling approach for the system components parameters. Based on this model, a hybrid method of fuzzy set and Monte Carlo Simulation is used to catch both randomness and fuzziness of component outage parameters.

This thesis addressed some aspects in the power system reliability domain. System reliability calculations can be more or less complex depending on:

- ✓ The quantity of components that compose the system;
- ✓ The operation mode of the system;
- ✓ The importance that each component has in the system operation.

Two basic functional aspects related with power system reliability are the system adequacy and system security. Adequacy assessment is the most presently used reliability evaluation technique in power system.

Reliability studies have as main objectives the identification of the system risk areas, the comparison of alternative expansion schemes or reinforcement, the analysis of the costs or reinforcements and interruptions and the comparison of alternative schemes for system operation and maintenance.

Reliability studies in complex systems require sophisticated methods like Monte Carlo Simulation that can be categorized into sequential and nonsequential sampling where the basic idea is to perform risk evaluation using an iteration process.

An aspect that is essential and very important for reliability assessment is data collection, the updating reliability data being a long-term and continuous task.

Failure frequency, repair time, failure and repair rates, unavailability, mean life and its standard deviation are the parameters for component outage models. These parameters are estimated by historical failure records which are the input data for the power system risk assessment. The data quality is a key issue in risk assessment, but it is known that uncertainties and errors in historical statistics are inevitable. Enhancing the accuracy and reducing the uncertainties and errors are of essential importance for parameters estimation.

The three levels for parameters estimation are the point estimation, interval estimation and distribution estimation. Point estimation results in a single value for each parameter, which corresponds to the sample mean. Interval estimation can be used to create the confidence range of a parameter and is very important to support the analysis of the impacts of input data uncertainties on the results of system risk assessment. Distribution estimation gives the probability distribution of a parameter and a significant enhancement in the accuracy of system risk assessment can be obtained using the probability distribution of input data.

The risk assessment of transmission systems is the most complicated one, mainly due to the complexity in the system analysis. It requires the use of power flow and optimal power flow algorithms.

This thesis presents the **F**uzzy **M**onte **C**arlo methodology for **T**ransmission **Rel**iability based studies (FMC-TRel methodology) that has been conceived in the scope of the MSc dissertation work. The main goal of the proposed methodology is to support decision making concerning the reduction of the occurrence probability of the systems states in transmission powers systems that cause load curtailment. The proposed methodology is based on the fuzzy-probabilistic models. A hybrid method of fuzzy set and Monte Carlo simulation is proposed to catch both randomness and fuzziness of component outage parameters. Components are represented using the two-state (up and down) model. The two-state models are created by Nonsequential Monte Carlo Simulation in order to determine the system states. With the system states, a network contingency analysis to identify any overloading or voltage violation in the network is performed. This is followed by a remedial action algorithm, based on Optimal Power Flow, to reschedule generations and alleviate constraint violations and, at the same time, to avoid any load curtailment, if possible, or, otherwise, to minimize the total load curtailment, for the states identified by the contingency analysis. For the system states that cause load curtailment, an optimization approach is used to reduce the probability of occurrence of the states that cause load curtailment in transmission system while minimizing the costs to achieve that reduction has been applied.

The examples in section 4 as well as the case study (Reliability Test System (RTS) 1996 IEEE 24 Bus) show with detail the application of the proposed methodology.

In the RTS 1996 IEEE 24 Bus the generators present the highest failure probability of all components types; consequently, the chance of generators hitting the down state is high.

To overcome the lack of historical data information, essential for the proposed methodology, some adaptations have been introduced in this test system. There was the need to specify the number of reparable outages for each component of the system for a time period of 10 years and the repair times for each reparable outage.

A Monte Carlo simulation based on nonsequential sampling has been applied to obtain the system states, with $\mathbf{3.40 \times 10^{-4}}$ of accuracy level which led to 4,000,000 cycles with 42,556 different system states. To reach the desired accuracy level Monte Carlo simulation process took a little more than 30 seconds. Through Monte Carlo simulation the utility can conclude that most the systems states have an occurrence probability that can vary between 0.000025 % and 0.499975 %.

A contingency analysis technique supported by AC Power Flow is used to identify situations with overloading and/or voltage violation. 1001 states that cause problems in the system have been identified.

A remedial action algorithm based on optimal power flow shows that there are 291 states for which re-dispatch solves the problem, 53 states with unfeasible solutions and 710 states with load curtailment. For the states with unfeasible solutions an inductance of 100MW in bus 6 has been used leading to only 4 states with unfeasible solutions. For these four states, it has been concluded that it was necessary to reduce the voltage lower bound to 0.8999 p.u. to obtain a feasible solution. The states with IDs P77, P78 and P81 are the states that lead to higher values of active load curtailment, with 9.32, 9.20 and 8.45 p.u. and states with IDs P23 and P65 lead to higher values of reactive load curtailment, with 1.12 and 1.03 p.u.

An optimization approach has been used with the objective of reducing the probability of occurrence of the states that cause load curtailment while minimizing the total costs to achieve that reduction. It is proposed to obtain 15% of reduction for the failure probability of each component in down state belonging to the states that cause load curtailment. Acting in repair time and in failure rate and acting in repair time only are the two approaches that have been used. It can be concluded that, with only 15% of reduction in failure probability of each component in down state, it can be obtained a reduction of around 50% in the probability of some states that cause load curtailment. This reduction has been proved by a new run of Monte Carlo simulation process that uses the new values of unavailability (obtained by the new values of failure rate and repair time which are given by the mathematical model with equations 4.57 to 4.60) that has been applied individually for each state that cause load curtailment, i.e., 710 Monte Carlo simulation processes.

However, it is much more liable to act in repair times than in failure rate. Repair time can be reduced by several ways: increasing operation personnel, upgrading the automation system, improvement of the state network system information as well as the combination of both actions.

It is important to note that if the number of occurrences in Monte Carlo simulation process is small, i.e. lower than four, the approach to reduce the occurrence probability of states that cause load curtailment could not be applied. This is due to the fact that it is not possible to get a reduction in the number of occurrences and, consequently, a probability occurrence reduction in a state that have already a very small number of occurrences. Due to this, only the first 48 states are considered (see annexes 9 and 10), i.e, the states with four or more occurrences.

The proposed methodology joins in the same architecture the Monte Carlo simulation, fuzzy logic and mathematic programming. An innovative tool to reduce the occurrence probability of the system states in transmission power systems that cause load curtailment while minimizing the total costs to achieve that reduction has been implemented based on this methodology. This tool is of most importance for a decision-support tool to support the transmission system operator in the identification of critical components and in the planning of future investments in the transmission power system, minimizing the unserved energy as well as load curtailment, avoiding an important monetary lost due to undelivered energy, economy damage and inconvenience to the transmission power systems users.

The work done in the scope of this thesis opens new horizons for future developments in the reliability area. Thus, the following list gives some suggestions for the upgrade of the proposed methodology:

- ✓ Enhance the Graphic User Interface for FMC-TRel in MATLAB GUI;
- ✓ Possibility of adopting more complete and realistic models for the residence component states, considering partial failure states;
- ✓ More complete representation of the electrical power system, considering for example the circuit breakers;
- ✓ Implementation of convergence acceleration techniques for Monte Carlo simulation process such as “importance sampling” and “antithetic variates”;
- ✓ Test of this methodology in real transmission networks;
- ✓ Adaptation of the methodology to distributions networks which should include a network reconfiguration algorithm;
- ✓ Develop a decision-support system to integrate the developed methodology in a computational environment which is more adequate to be directly used by network operators;
- ✓ Adapt and use the Cross-Entropy, which is an adaptive algorithm for estimating probabilities of rare events in complex networks, for enhancing and getting system states faster to be analyzed

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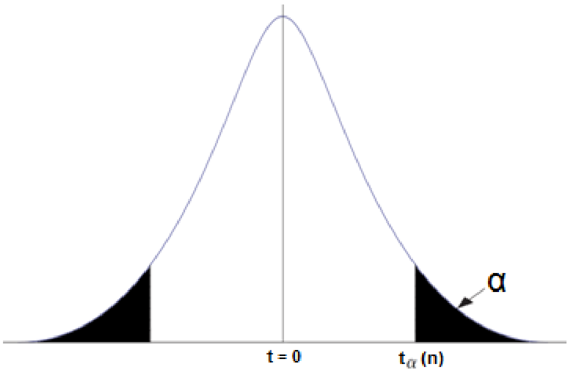
Annex 1

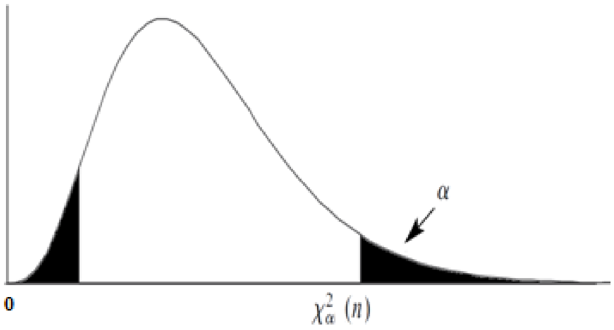
Relationship between α and $\boldsymbol{t_\alpha(n)}$ under the t-distribution



$t_\alpha(n)$					
n	α				
	0.1	0.05	0.025	0.01	0.005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.92	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.44	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.86	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.25
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.35	1.771	2.16	2.65	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.12	2.583	2.921
17	1.333	1.74	2.11	2.567	2.898
18	1.33	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.08	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.5	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.06	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
500	1.283	1.648	1.965	2.334	2.586
1000	1.282	1.646	1.962	2.33	2.581

Annex 2

Relationship between α and $\boldsymbol{\chi^2_\alpha(n)}$ *under the* $\boldsymbol{\chi^2}$ *distribution*



n	$\chi^2_\alpha(n)$							
	α							
	0.995	0.99	0.975	0.95	0.05	0.025	0.01	0.005
1	0.0000393	0.000157	0.000982	0.00393	3.841	5.024	6.635	7.879
2	0.01	0.0201	0.0506	0.103	5.991	7.378	9.21	10.597
3	0.0717	0.115	0.216	0.352	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	9.488	11.143	13.277	14.86
5	0.412	0.554	0.831	1.145	11.07	12.832	15.086	16.75
6	0.676	0.872	1.237	1.635	12.592	14.449	16.812	18.548
7	0.989	1.239	1.69	2.167	14.067	16.013	18.475	20.278
8	1.344	1.646	2.18	2.733	15.507	17.535	20.09	21.955
9	1.735	2.088	2.7	3.325	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.94	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	19.675	21.92	24.725	26.757
12	3.074	3.571	4.404	5.226	21.026	23.337	26.217	28.3
13	3.565	4.107	5.009	5.892	22.362	24.736	27.688	29.819
14	4.075	4.66	5.629	6.571	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	26.296	28.845	32	34.267
17	5.697	6.408	7.564	8.672	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.39	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	30.144	32.852	36.191	38.582
20	7.434	8.26	9.591	10.851	31.41	34.17	37.566	39.997
21	8.034	8.897	10.283	11.591	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	33.924	36.781	40.289	42.796
23	9.26	10.196	11.689	13.091	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	36.415	39.364	42.98	45.558
25	10.52	11.524	13.12	14.611	37.652	40.646	44.314	46.928
26	11.16	12.198	13.844	15.379	38.885	41.923	45.642	48.29
27	11.808	12.879	14.573	16.151	40.113	43.194	46.963	49.645
28	12.461	13.565	15.308	16.928	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	67.505	71.42	76.154	79.49
60	35.534	37.485	40.482	43.188	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	90.531	95.023	100.425	104.215
80	51.172	53.54	57.153	60.391	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	124.342	129.561	135.807	140.17

Annex 3

Lines, Cables and Transformers

Component	Transmission Cable Bus 1 to Bus 2		
1	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	1	17.50
		2	14.00
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	16.50
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.802776	10	3	48.00

Component	Transmission Line Bus 1 to Bus 3		
2	Year	Outage	Time (hours)
	2000	1	8.50
		2	10.50
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	1	10.00
	2005	NA	NA
	2006	1	10.50
	2007	NA	NA
	2008	NA	NA
	2009	1	10.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.866025	10	5	50.00

Component	Transmission Line Bus 3 to Bus 9		
6	Year	Outage	Time (hours)
	2000	1	9.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.50
		2	10.00
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	1	9.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.080123	10	4	40.00

Component	Transmission Line Bus 5 to Bus 10		
9	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.50
		2	10.50
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	1	9.00
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.866025	10	3	30.00

Component	Transmission Line Bus 1 to Bus 5		
3	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.00
	2003	1	9.00
	2004	NA	NA
	2005	NA	NA
	2006	1	11.00
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1	10	3	30.00

Component	Transmission Transf. Bus 3 to Bus 24		
7	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	769.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	767.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.414214	10	2	1536.00

Component	Transmission Line Bus 4 to Bus 9		
8	Year	Outage	Time (hours)
	2000	1	11.00
	2001	1	9.50
	2002	NA	NA
	2003	NA	NA
	2004	1	9.50
	2005	NA	NA
	2006	NA	NA
	2007	1	10.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.707107	10	4	40.00

Component	Transmission Line Bus 7 to Bus 8		
11	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	1	9.50
	2004	NA	NA
	2005	1	10.50
	2006	NA	NA
	2007	1	10.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.5	10	3	30.00

Component	Transmission Line Bus 2 to Bus 4		
4	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	11.00
		2	9.00
		3	9.50
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	10.50
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.912871	10	4	40.00

Component	Transmission Line Bus 2 to Bus 6		
5	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.00
		2	9.00
		3	10.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	9.50
	2008	NA	NA
	2009	1	10.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.790569	10	5	50.00

Component	Transmission Line Bus 8 to Bus 9		
12	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	9.00
		2	9.00
		3	11.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	11.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.154701	10	4	40.00

Component	Transmission Line Bus 8 to Bus 10		
13	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.50
		2	9.00
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	1	10.50
		2	10.00
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.7071068	10	4	40.00

Component	Transmission Line Bus 12 to Bus 23		
21	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	11.00
		2	10.20
		3	11.80
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	11.00
		2	11.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.565685	10	5	55.00

Component	Transmission Line Bus 6 to Bus 10		
10	Year	Outage	Time (hours)
	2000	1	33.00
		2	38.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	1	34.00
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
2.645751	10	3	105.00

Component	Transmission Transf. Bus 9 to Bus 12		
15	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	1	767.00
		2	769.00
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.414214	10	2	1536.00

Component	Transmission Line Bus 11 to Bus 13		
18	Year	Outage	Time (hours)
	2000	1	7.50
		2	11.50
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	15.00
	2006	NA	NA
	2007	NA	NA
	2008	1	10.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
3.135815	10	4	44.00

Component	Transmission Line Bus 12 to Bus 13		
20	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	1	11.40
		2	10.60
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	10.50
	2008	NA	NA
	2009	1	11.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.522813	10	4	44.00

Component	Transmission Transf. Bus 9 to Bus 11		
14	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	1	770.00
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	1	766.00
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
2.828427	10	2	1536.00

Component	Transmission Transf. Bus 10 to Bus 11		
16	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	770.00
	2003	1	766.00
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
2.828427	10	2	1536.00

Component	Transmission Transf. Bus 10 to Bus 12		
17	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	770.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	766.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
2.828427	10	2	1536.00

Component	Transmission Line Bus 14 to Bus 16		
23	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.00
	2002	NA	NA
	2003	1	11.00
	2004	NA	NA
	2005	NA	NA
	2006	1	10.50
	2007	NA	NA
	2008	NA	NA
	2009	1	11.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.408248	10	4	44.00

Component	Transmission Line Bus 11 to Bus 14		
19	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.00
		2	10.00
		3	12.00
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	12.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.154701	10	4	44.00

Component	Transmission Line Bus 15 to Bus 21		
25	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.00
		2	11.20
	2006	1	10.80
		2	11.00
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.163299	10	4	44.00

Component	Transmission Line Bus 15 to Bus 21		
26	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	11.00
		2	10.50
		3	11.50
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.408248	10	4	44.00

Component	Transmission Line Bus 17 to Bus 18		
30	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.50
		2	11.00
		3	10.50
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.5	10	3	33.00

Component	Transmission Line Bus 13 to Bus 23		
22	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.50
	2002	NA	NA
	2003	NA	NA
	2004	1	10.50
		2	11.00
	2005	NA	NA
	2006	NA	NA
	2007	1	11.00
	2008	NA	NA
	2009	1	11.00
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.353553	10	5	55.00

Component	Transmission Line Bus 15 to Bus 16		
24	Year	Outage	Time (hours)
	2000	1	10.50
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	12.00
		2	10.50
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.866025	10	3	33.00

Component	Transmission Line Bus 16 to Bus 19		
29	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	1	12.00
	2004	NA	NA
	2005	1	10.50
		2	10.50
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.866025	10	3	33.00

Component	Transmission Line Bus 20 to Bus 23		
36	Year	Outage	Time (hours)
	2000	1	10.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.70
		2	11.30
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.888819	10	3	33.00

Component	Transmission Line Bus 20 to Bus 23		
37	Year	Outage	Time (hours)
	2000	1	12.00
		2	11.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	10.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
1.000000	10	3	33.00

Component	Transmission Line Bus 15 to Bus 24		
27	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.00
	2002	1	11.00
	2003	1	12.00
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	1	10.00
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.816497	10	4	44.00

Component	Transmission Line Bus 16 to Bus 17		
28	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	11.60
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.40
	2006	NA	NA
	2007	NA	NA
	2008	1	10.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.87178	10	3	33.00

Component	Transmission Line Bus 18 to Bus 21		
33	Year	Outage	Time (hours)
	2000	NA	NA
	2001	1	10.00
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	12.00
	2006	NA	NA
	2007	NA	NA
	2008	1	11.00
	2009	1	11.00
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.816497	10	4	44.00

Component	Transmission Line Bus 17 to Bus 22		
31	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	1	11.00
		2	10.60
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	11.40
		2	11.00
	2009	1	11.00
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.282843	10	5	55.00

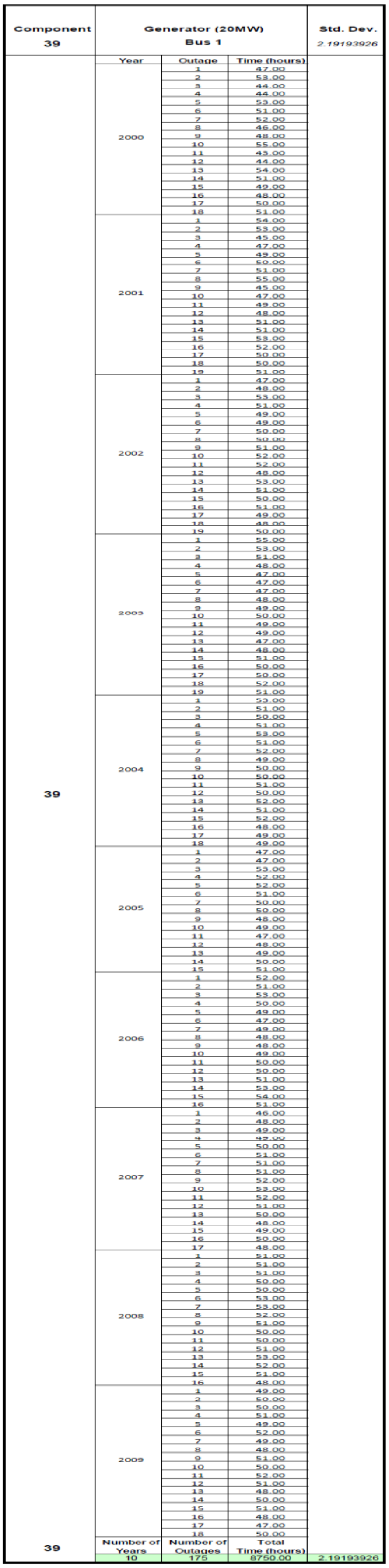
Component	Transmission Line Bus 18 to Bus 21		
32	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.00
		2	10.50
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	1	12.00
		2	11.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.912871	10	4	44.00

Component	Transmission Line Bus 19 to Bus 20		
34	Year	Outage	Time (hours)
	2000	NA	NA
	2001	NA	NA
	2002	1	10.40
		2	11.60
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	NA	NA
	2007	NA	NA
	2008	1	11.00
		2	11.00
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.489898	10	4	44.00

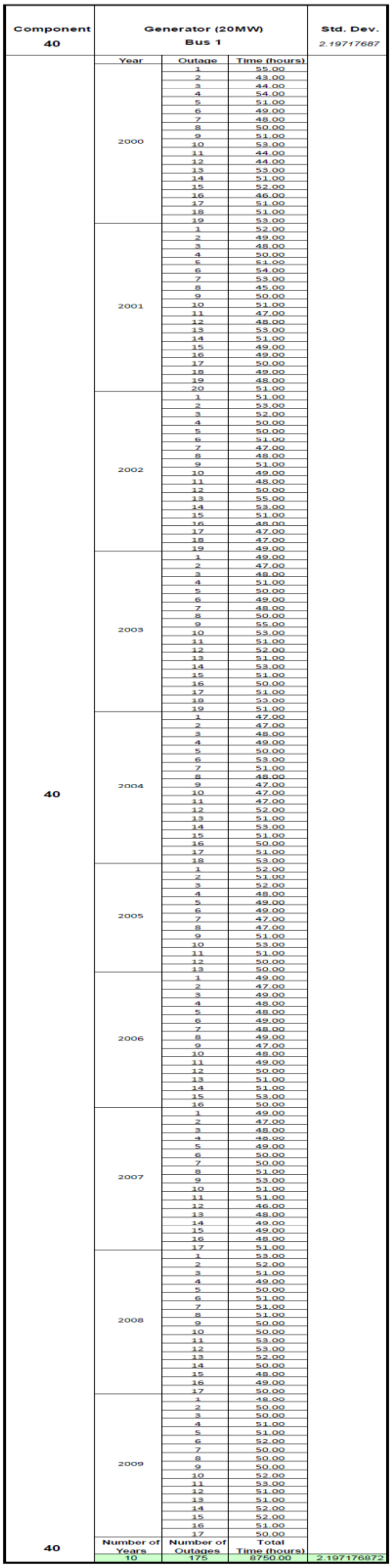
Component	Transmission Line Bus 19 to Bus 20		
35	Year	Outage	Time (hours)
	2000	1	11.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	1	11.40
		2	10.60
		3	11.00
	2006	NA	NA
	2007	NA	NA
	2008	NA	NA
	2009	NA	NA
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.326599	10	4	44.00

Component	Transmission Line Bus 21 to Bus 22		
38	Year	Outage	Time (hours)
	2000	1	11.00
		2	10.00
		3	12.00
	2001	NA	NA
	2002	NA	NA
	2003	NA	NA
	2004	NA	NA
	2005	NA	NA
	2006	1	11.50
	2007	NA	NA
	2008	NA	NA
	2009	1	10.50
Std. Dev.	Number of Years	Number of Outages	Total Time (hours)
0.790569	10	5	55.00

Generators



Component 39	Generator (20MW) Bus 1			Std. Dev. 2.19193926
39	Year	Outage	Time (hours)	
	2000	1	47.00	
		2	53.00	
		3	44.00	
		4	44.00	
		5	53.00	
		6	51.00	
		7	52.00	
		8	46.00	
		9	48.00	
		10	55.00	
		11	43.00	
		12	44.00	
		13	54.00	
		14	51.00	
		15	49.00	
		16	48.00	
		17	50.00	
		18	51.00	
	2001	1	54.00	
		2	53.00	
		3	45.00	
		4	47.00	
		5	49.00	
		6	50.00	
		7	51.00	
		8	55.00	
		9	45.00	
		10	47.00	
		11	49.00	
		12	48.00	
		13	51.00	
		14	51.00	
		15	53.00	
		16	52.00	
		17	50.00	
		18	50.00	
		19	51.00	
	2002	1	47.00	
		2	48.00	
		3	53.00	
		4	51.00	
		5	49.00	
		6	49.00	
		7	50.00	
		8	50.00	
		9	51.00	
		10	52.00	
		11	52.00	
		12	48.00	
		13	53.00	
		14	51.00	
		15	50.00	
		16	51.00	
		17	49.00	
		18	48.00	
		19	50.00	
	2003	1	55.00	
		2	53.00	
		3	51.00	
		4	48.00	
		5	47.00	
		6	47.00	
		7	47.00	
		8	48.00	
		9	49.00	
		10	50.00	
		11	49.00	
		12	49.00	
		13	47.00	
		14	48.00	
		15	51.00	
		16	50.00	
		17	50.00	
		18	52.00	
		19	51.00	
	2004	1	53.00	
		2	51.00	
		3	50.00	
		4	51.00	
		5	53.00	
		6	51.00	
		7	52.00	
		8	49.00	
		9	50.00	
		10	50.00	
		11	51.00	
		12	50.00	
		13	52.00	
		14	51.00	
		15	52.00	
		16	48.00	
		17	49.00	
		18	49.00	
	2005	1	47.00	
		2	47.00	
		3	53.00	
		4	52.00	
		5	52.00	
		6	51.00	
		7	50.00	
		8	50.00	
		9	48.00	
		10	49.00	
		11	47.00	
		12	48.00	
		13	49.00	
		14	50.00	
		15	51.00	
	2006	1	52.00	
		2	51.00	
		3	53.00	
		4	50.00	
		5	49.00	
		6	47.00	
		7	49.00	
		8	48.00	
		9	48.00	
		10	49.00	
		11	50.00	
		12	50.00	
		13	51.00	
		14	53.00	
		15	54.00	
		16	51.00	
	2007	1	46.00	
		2	48.00	
		3	49.00	
		4	49.00	
		5	50.00	
		6	51.00	
		7	51.00	
		8	51.00	
		9	52.00	
		10	53.00	
		11	52.00	
		12	51.00	
		13	50.00	
		14	48.00	
		15	49.00	
		16	50.00	
		17	48.00	
	2008	1	51.00	
		2	51.00	
		3	51.00	
		4	50.00	
		5	50.00	
		6	53.00	
		7	53.00	
		8	52.00	
		9	51.00	
		10	50.00	
		11	50.00	
		12	51.00	
		13	53.00	
		14	52.00	
		15	51.00	
		16	48.00	
	2009	1	49.00	
		2	50.00	
		3	50.00	
		4	51.00	
		5	49.00	
		6	52.00	
		7	49.00	
		8	48.00	
		9	51.00	
		10	50.00	
		11	52.00	
		12	51.00	
		13	48.00	
		14	50.00	
		15	51.00	
		16	48.00	
		17	47.00	
		18	50.00	
39	Number of Years	Number of Outages	Total Time (hours)	
	10	175	8750.00	2.19193926



Component 40	Generator (20MW) Bus 1			Std. Dev. 2.19717687
40	Year	Outage	Time (hours)	
	2000	1	55.00	
		2	43.00	
		3	44.00	
		4	54.00	
		5	51.00	
		6	49.00	
		7	48.00	
		8	50.00	
		9	51.00	
		10	53.00	
		11	44.00	
		12	44.00	
		13	53.00	
		14	51.00	
		15	52.00	
		16	46.00	
		17	51.00	
		18	51.00	
		19	53.00	
	2001	1	52.00	
		2	49.00	
		3	48.00	
		4	50.00	
		5	51.00	
		6	54.00	
		7	53.00	
		8	45.00	
		9	50.00	
		10	51.00	
		11	47.00	
		12	48.00	
		13	53.00	
		14	51.00	
		15	49.00	
		16	49.00	
		17	50.00	
		18	49.00	
		19	48.00	
		20	51.00	
	2002	1	51.00	
		2	53.00	
		3	52.00	
		4	50.00	
		5	50.00	
		6	51.00	
		7	47.00	
		8	48.00	
		9	51.00	
		10	49.00	
		11	48.00	
		12	50.00	
		13	55.00	
		14	53.00	
		15	51.00	
		16	48.00	
		17	47.00	
		18	47.00	
		19	49.00	
	2003	1	49.00	
		2	47.00	
		3	48.00	
		4	51.00	
		5	50.00	
		6	49.00	
		7	48.00	
		8	50.00	
		9	55.00	
		10	53.00	
		11	51.00	
		12	52.00	
		13	51.00	
		14	53.00	
		15	51.00	
		16	50.00	
		17	51.00	
		18	53.00	
		19	51.00	
	2004	1	47.00	
		2	47.00	
		3	48.00	
		4	49.00	
		5	50.00	
		6	53.00	
		7	51.00	
		8	48.00	
		9	47.00	
		10	47.00	
		11	47.00	
		12	52.00	
		13	51.00	
		14	53.00	
		15	51.00	
		16	50.00	
		17	51.00	
		18	53.00	
	2005	1	52.00	
		2	51.00	
		3	52.00	
		4	48.00	
		5	49.00	
		6	49.00	
		7	47.00	
		8	47.00	
		9	51.00	
		10	53.00	
		11	51.00	
		12	50.00	
		13	50.00	
	2006	1	49.00	
		2	47.00	
		3	49.00	
		4	48.00	
		5	48.00	
		6	49.00	
		7	48.00	
		8	49.00	
		9	47.00	
		10	48.00	
		11	49.00	
		12	50.00	
		13	51.00	
		14	51.00	
		15	53.00	
		16	50.00	
	2007	1	49.00	
		2	47.00	
		3	48.00	
		4	48.00	
		5	49.00	
		6	50.00	
		7	50.00	
		8	51.00	
		9	53.00	
		10	51.00	
		11	51.00	
		12	46.00	
		13	48.00	
		14	49.00	
		15	49.00	
		16	48.00	
		17	51.00	
	2008	1	53.00	
		2	52.00	
		3	51.00	
		4	49.00	
		5	50.00	
		6	51.00	
		7	51.00	
		8	51.00	
		9	50.00	
		10	50.00	
		11	53.00	
		12	53.00	
		13	52.00	
		14	50.00	
		15	48.00	
		16	49.00	
		17	50.00	
	2009	1	48.00	
		2	50.00	
		3	50.00	
		4	51.00	
		5	51.00	
		6	52.00	
		7	50.00	
		8	50.00	
		9	50.00	
		10	52.00	
		11	53.00	
		12	51.00	
		13	51.00	
		14	52.00	
		15	52.00	
		16	51.00	
		17	50.00	
40	Number of Years	Number of Outages	Total Time (hours)	
	10	175	8750.00	2.197176872

Component **43**	**Generator (20MW)** **Bus 2**			**Std. Dev.** *2.40210636*
	Year	**Outage**	**Time (hours)**	
43	2000	1	51.00	
		2	49.00	
		3	48.00	
		4	50.00	
		5	51.00	
		6	54.00	
		7	53.00	
		8	45.00	
		9	47.00	
		10	49.00	
		11	48.00	
		12	50.00	
		13	51.00	
		14	53.00	
		15	44.00	
		16	44.00	
	2001	1	53.00	
		2	51.00	
		3	52.00	
		4	46.00	
		5	51.00	
		6	51.00	
		7	53.00	
		8	45.00	
		9	50.00	
		10	51.00	
		11	47.00	
		12	48.00	
		13	53.00	
		14	51.00	
		15	49.00	
		16	49.00	
		17	50.00	
		18	49.00	
		19	48.00	
		20	51.00	
	2002	1	55.00	
		2	45.00	
		3	47.00	
		4	49.00	
		5	48.00	
		6	51.00	
		7	51.00	
		8	53.00	
		9	52.00	
		10	50.00	
		11	47.00	
		12	53.00	
		13	44.00	
		14	44.00	
		15	53.00	
		16	51.00	
	2003	1	52.00	
		2	46.00	
		3	48.00	
		4	55.00	
		5	43.00	
		6	47.00	
		7	49.00	
		8	54.00	
		9	51.00	
		10	49.00	
		11	48.00	
		12	50.00	
		13	51.00	
		14	53.00	
		15	44.00	
		16	44.00	
		17	53.00	
		18	51.00	
		19	52.00	
	2004	1	46.00	
		2	50.00	
		3	51.00	
		4	52.00	
		5	52.00	
		6	48.00	
		7	53.00	
		8	51.00	
		9	50.00	
		10	51.00	
		11	49.00	
		12	49.00	
		13	48.00	
		14	50.00	
		15	55.00	
		16	53.00	
		17	51.00	
		18	48.00	
		19	47.00	
		20	47.00	
		21	49.00	
		22	49.00	
	2005	1	47.00	
		2	48.00	
		3	51.00	
		4	50.00	
		5	48.00	
		6	53.00	
		7	51.00	
		8	50.00	
		9	51.00	
		10	49.00	
		11	48.00	
		12	50.00	
		13	55.00	
		14	53.00	
		15	51.00	
		16	51.00	
		17	52.00	
	2006	1	48.00	
		2	49.00	
		3	49.00	
		4	52.00	
		5	52.00	
		6	51.00	
		7	53.00	
		8	51.00	
		9	50.00	
		10	50.00	
		11	49.00	
		12	51.00	
		13	48.00	
		14	47.00	
		15	47.00	
	2007	1	47.00	
		2	52.00	
		3	51.00	
		4	53.00	
		5	51.00	
		6	50.00	
		7	52.00	
		8	50.00	
		9	50.00	
		10	51.00	
		11	47.00	
		12	48.00	
		13	53.00	
		14	51.00	
		15	49.00	
		16	49.00	
		17	50.00	
	2008	1	50.00	
		2	51.00	
		3	51.00	
		4	51.00	
		5	52.00	
		6	51.00	
		7	50.00	
		8	48.00	
		9	49.00	
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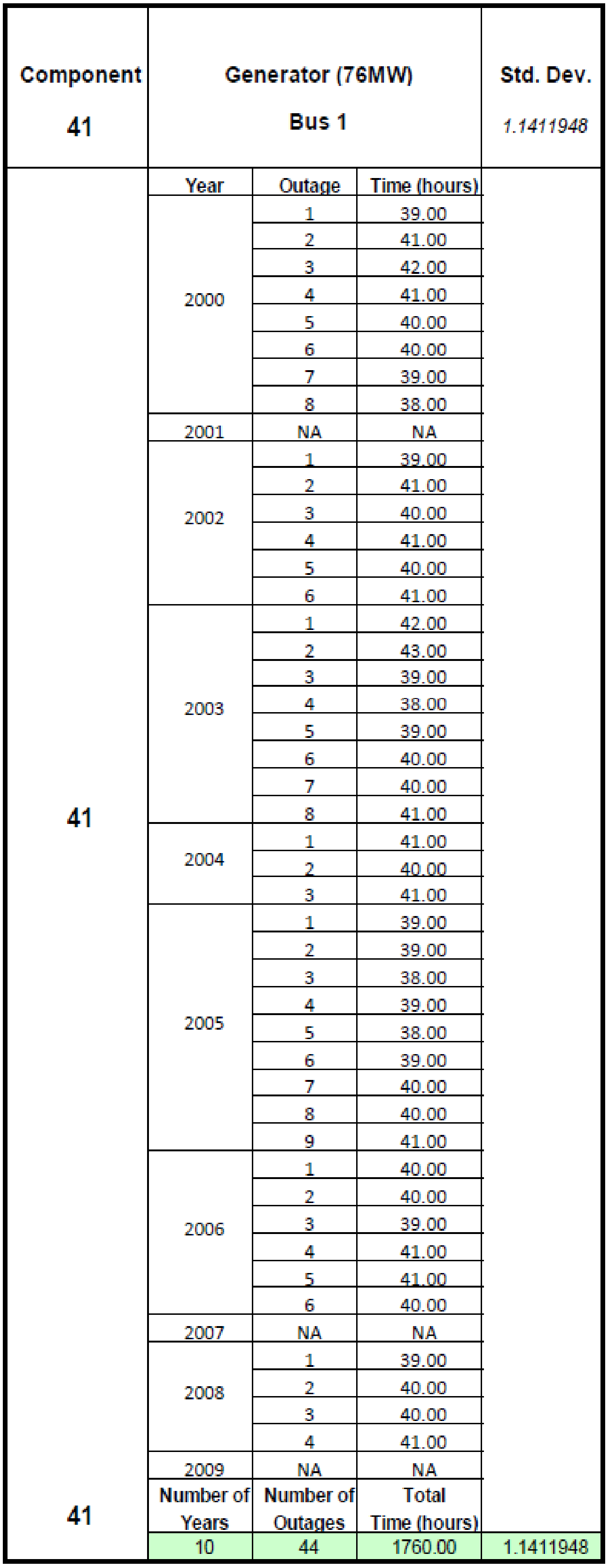
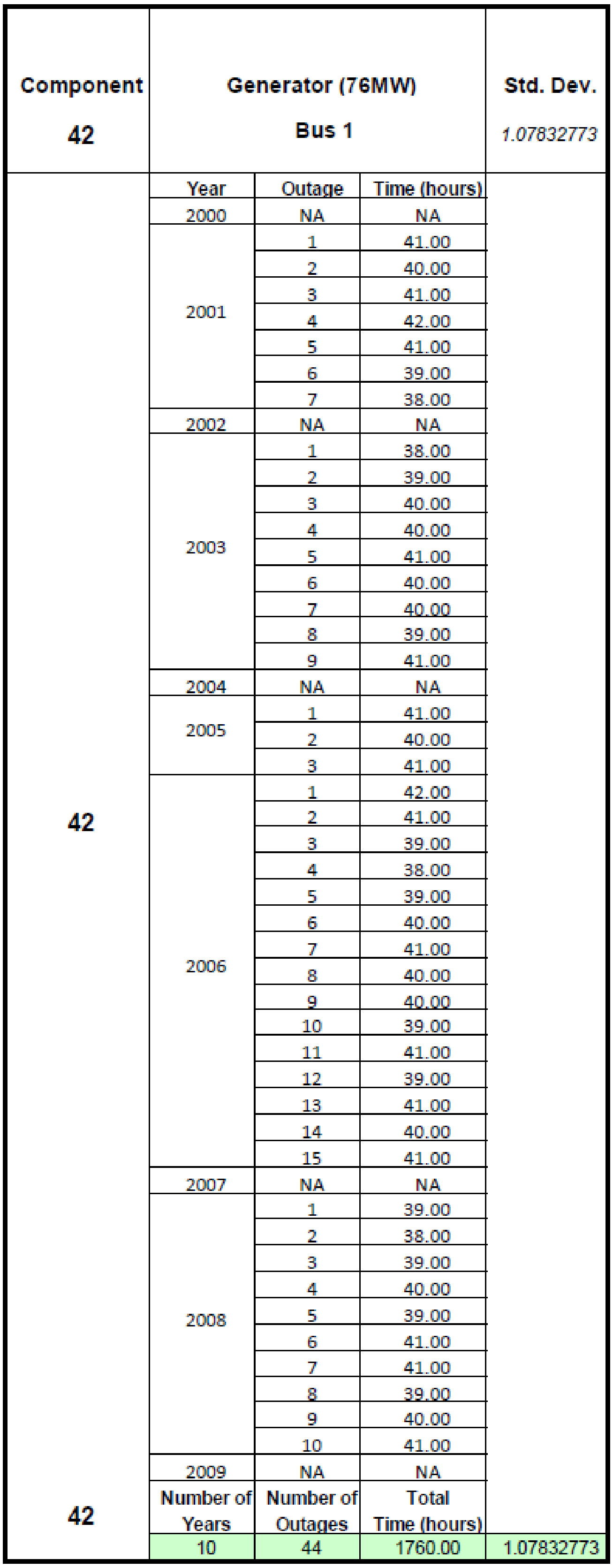
		11	51.00	
		12	51.00	
		13	51.00	
		14	53.00	
		15	52.00	
		16	50.00	
		17	50.00	
	2009	1	49.00	
		2	51.00	
		3	49.00	
		4	50.00	
		5	51.00	
		6	51.00	
		7	51.00	
		8	52.00	
		9	53.00	
		10	52.00	
		11	53.00	
		12	51.00	
		13	51.00	
		14	49.00	
		15	51.00	
		16	50.00	
43	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	175	8750.00	2.402106355

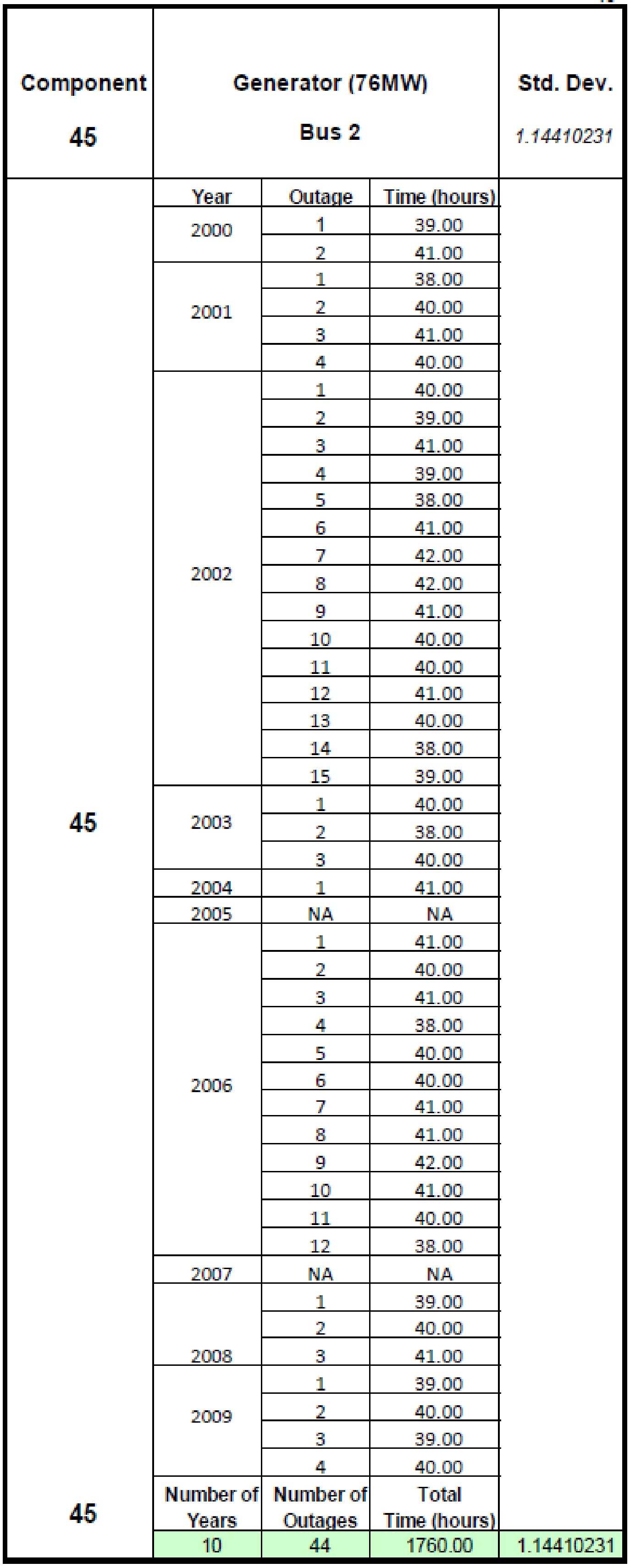
Component **44**	**Generator (20MW)** **Bus 2**			**Std. Dev.** *2.29942522*
	Year	**Outage**	**Time (hours)**	
44	2000	1	53.00	
		2	51.00	
		3	52.00	
		4	46.00	
		5	51.00	
		6	51.00	
		7	53.00	
		8	52.00	
		9	49.00	
		10	48.00	
		11	50.00	
		12	51.00	
		13	51.00	
		14	52.00	
		15	52.00	
		16	51.00	
		17	51.00	
		18	53.00	
		19	52.00	
		20	50.00	
		21	51.00	
	2001	1	47.00	
		2	48.00	
		3	53.00	
		4	51.00	
		5	49.00	
		6	49.00	
		7	50.00	
		8	49.00	
		9	50.00	
		10	55.00	
		11	53.00	
		12	51.00	
		13	50.00	
		14	50.00	
		15	49.00	
		16	51.00	
		17	48.00	
		18	49.00	
		19	50.00	
		20	49.00	
		21	49.00	
		22	47.00	
	2002	1	43.00	
		2	44.00	
		3	54.00	
		4	51.00	
		5	49.00	
		6	48.00	
		7	50.00	
		8	51.00	
		9	53.00	
		10	44.00	
		11	44.00	
		12	53.00	
		13	51.00	
		14	52.00	
		15	46.00	
		16	51.00	
	2003	1	53.00	
		2	51.00	
		3	48.00	
		4	50.00	
		5	50.00	
		6	49.00	
		7	49.00	
		8	47.00	
		9	48.00	
		10	51.00	
		11	50.00	
		12	47.00	
		13	48.00	
		14	53.00	
		15	51.00	
		16	49.00	
		17	49.00	
	2004	1	50.00	
		2	49.00	
		3	48.00	
		4	51.00	
		5	51.00	
		6	53.00	
		7	52.00	
		8	50.00	
		9	50.00	
		10	51.00	
		11	47.00	
		12	48.00	
		13	51.00	
		14	49.00	
		15	48.00	
		16	50.00	
	2005	1	44.00	
		2	44.00	
		3	53.00	
		4	51.00	
		5	52.00	
		6	49.00	
		7	48.00	
		8	55.00	
		9	43.00	
		10	47.00	
		11	49.00	
		12	54.00	
		13	51.00	
		14	49.00	
		15	53.00	
		16	51.00	
		17	47.00	
		18	47.00	
		19	48.00	
		20	49.00	
	2006	1	50.00	
		2	53.00	
		3	51.00	
		4	50.00	
		5	47.00	
		6	47.00	
		7	47.00	
		8	52.00	
		9	51.00	
		10	53.00	
		11	49.00	
		12	50.00	
		13	49.00	
		14	48.00	
		15	51.00	
	2007	1	55.00	
		2	45.00	
		3	47.00	
		4	49.00	
		5	52.00	
		6	51.00	
		7	51.00	
		8	53.00	
		9	52.00	
		10	52.00	
		11	50.00	
		12	50.00	
		13	49.00	
		14	51.00	
		15	49.00	
		16	50.00	
		17	51.00	
		18	51.00	
	2008	1	51.00	
		2	52.00	
		3	51.00	
		4	50.00	
		5	51.00	
		6	53.00	
		7	52.00	
		8	51.00	
		9	52.00	
		10	48.00	
		11	49.00	
		12	49.00	
		13	47.00	
		14	47.00	
		15	51.00	
		16	53.00	
	2009	1	51.00	
		2	50.00	
		3	52.00	
		4	51.00	
		5	52.00	
		6	49.00	
		7	50.00	
		8	50.00	
		9	51.00	
		10	51.00	
		11	51.00	
		12	51.00	
		13	52.00	
		14	50.00	
44	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	175	8750.00	2.299425216



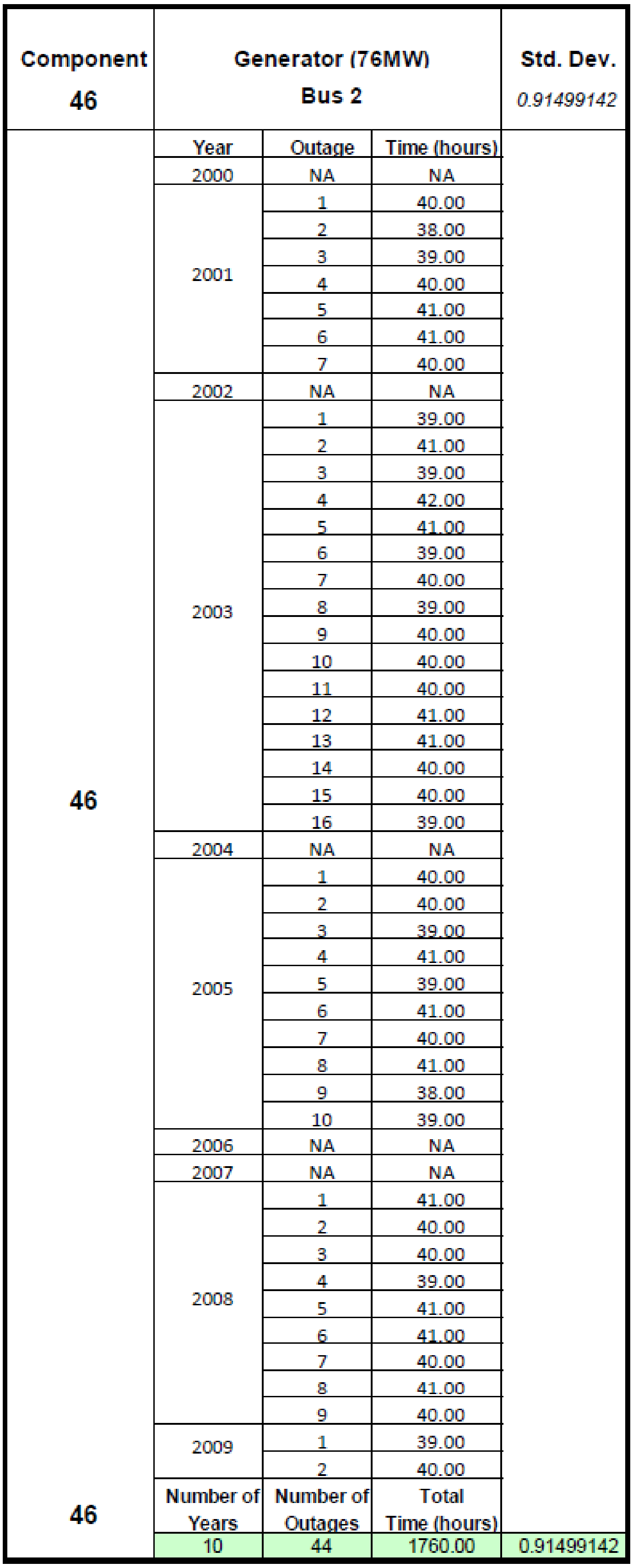
Component 41	Generator (76MW) Bus 1			Std. Dev. 1.1411948
	Year	Outage	Time (hours)	
41	2000	1	39.00	
		2	41.00	
		3	42.00	
		4	41.00	
		5	40.00	
		6	40.00	
		7	39.00	
		8	38.00	
	2001	NA	NA	
	2002	1	39.00	
		2	41.00	
		3	40.00	
		4	41.00	
		5	40.00	
		6	41.00	
	2003	1	42.00	
		2	43.00	
		3	39.00	
		4	38.00	
		5	39.00	
		6	40.00	
		7	40.00	
		8	41.00	
	2004	1	41.00	
		2	40.00	
		3	41.00	
	2005	1	39.00	
		2	39.00	
		3	38.00	
		4	39.00	
		5	38.00	
		6	39.00	
		7	40.00	
		8	40.00	
		9	41.00	
	2006	1	40.00	
		2	40.00	
		3	39.00	
		4	41.00	
		5	41.00	
		6	40.00	
	2007	NA	NA	
	2008	1	39.00	
		2	40.00	
		3	40.00	
		4	41.00	
	2009	NA	NA	
41	Number of Years	Number of Outages	Total Time (hours)	
	10	44	1760.00	1.1411948



Component 42	Generator (76MW) Bus 1			Std. Dev. 1.07832773
	Year	Outage	Time (hours)	
42	2000	NA	NA	
	2001	1	41.00	
		2	40.00	
		3	41.00	
		4	42.00	
		5	41.00	
		6	39.00	
		7	38.00	
	2002	NA	NA	
	2003	1	38.00	
		2	39.00	
		3	40.00	
		4	40.00	
		5	41.00	
		6	40.00	
		7	40.00	
		8	39.00	
		9	41.00	
	2004	NA	NA	
	2005	1	41.00	
		2	40.00	
		3	41.00	
	2006	1	42.00	
		2	41.00	
		3	39.00	
		4	38.00	
		5	39.00	
		6	40.00	
		7	41.00	
		8	40.00	
		9	40.00	
		10	39.00	
		11	41.00	
		12	39.00	
		13	41.00	
		14	40.00	
		15	41.00	
	2007	NA	NA	
	2008	1	39.00	
		2	38.00	
		3	39.00	
		4	40.00	
		5	39.00	
		6	41.00	
		7	41.00	
		8	39.00	
		9	40.00	
		10	41.00	
	2009	NA	NA	
42	Number of Years	Number of Outages	Total Time (hours)	
	10	44	1760.00	1.07832773



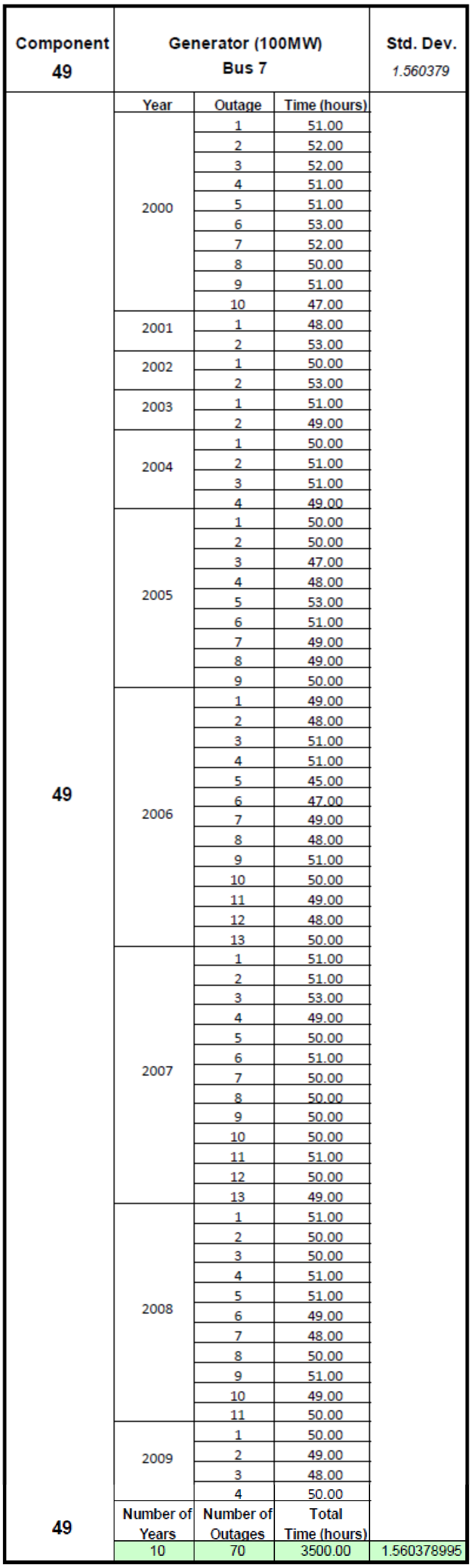
Component 45	Generator (76MW) Bus 2			Std. Dev. 1.14410231
	Year	Outage	Time (hours)	
45	2000	1	39.00	
		2	41.00	
	2001	1	38.00	
		2	40.00	
		3	41.00	
		4	40.00	
	2002	1	40.00	
		2	39.00	
		3	41.00	
		4	39.00	
		5	38.00	
		6	41.00	
		7	42.00	
		8	42.00	
		9	41.00	
		10	40.00	
		11	40.00	
		12	41.00	
		13	40.00	
		14	38.00	
		15	39.00	
	2003	1	40.00	
		2	38.00	
		3	40.00	
	2004	1	41.00	
	2005	NA	NA	
	2006	1	41.00	
		2	40.00	
		3	41.00	
		4	38.00	
		5	40.00	
		6	40.00	
		7	41.00	
		8	41.00	
		9	42.00	
		10	41.00	
		11	40.00	
		12	38.00	
	2007	NA	NA	
	2008	1	39.00	
		2	40.00	
		3	41.00	
	2009	1	39.00	
		2	40.00	
		3	39.00	
		4	40.00	
45	Number of Years	Number of Outages	Total Time (hours)	
	10	44	1760.00	1.14410231



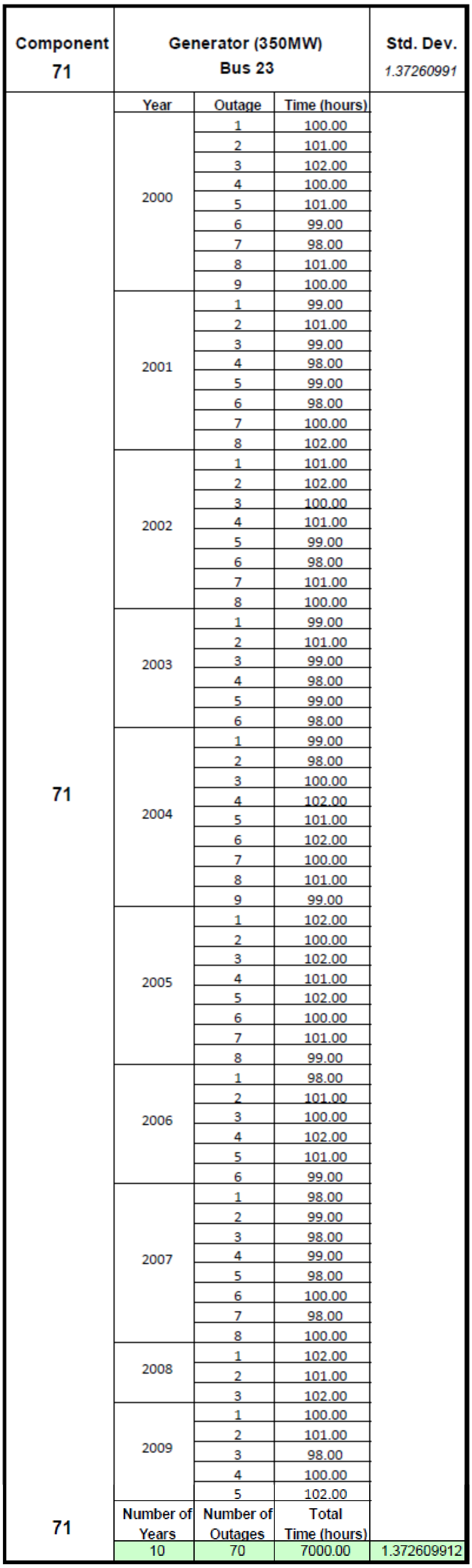
Component 46	Generator (76MW) Bus 2			Std. Dev. 0.91499142
	Year	Outage	Time (hours)	
46	2000	NA	NA	
	2001	1	40.00	
		2	38.00	
		3	39.00	
		4	40.00	
		5	41.00	
		6	41.00	
		7	40.00	
	2002	NA	NA	
	2003	1	39.00	
		2	41.00	
		3	39.00	
		4	42.00	
		5	41.00	
		6	39.00	
		7	40.00	
		8	39.00	
		9	40.00	
		10	40.00	
		11	40.00	
		12	41.00	
		13	41.00	
		14	40.00	
		15	40.00	
		16	39.00	
	2004	NA	NA	
	2005	1	40.00	
		2	40.00	
		3	39.00	
		4	41.00	
		5	39.00	
		6	41.00	
		7	40.00	
		8	41.00	
		9	38.00	
		10	39.00	
	2006	NA	NA	
	2007	NA	NA	
	2008	1	41.00	
		2	40.00	
		3	40.00	
		4	39.00	
		5	41.00	
		6	41.00	
		7	40.00	
		8	41.00	
		9	40.00	
	2009	1	39.00	
		2	40.00	
46	Number of Years	Number of Outages	Total Time (hours)	
	10	44	1760.00	0.91499142

Component **47**	**Generator (100MW)** **Bus 7**			**Std. Dev.** *1.34056013*
	Year	Outage	Time (hours)	
47	2000	1	51.00	
		2	52.00	
		3	51.00	
	2001	1	50.00	
		2	48.00	
		3	51.00	
		4	50.00	
		5	48.00	
		6	51.00	
		7	51.00	
		8	51.00	
		9	50.00	
		10	50.00	
		11	53.00	
	2002	1	49.00	
		2	49.00	
	2003	1	51.00	
		2	51.00	
		3	53.00	
		4	51.00	
		5	51.00	
		6	49.00	
		7	48.00	
		8	52.00	
		9	49.00	
		10	48.00	
	2004	1	51.00	
	2005	1	50.00	
		2	51.00	
		3	51.00	
		4	49.00	
		5	50.00	
		6	48.00	
		7	48.00	
		8	50.00	
		9	51.00	
		10	51.00	
		11	53.00	
		12	51.00	
		13	51.00	
		14	50.00	
	2006	1	50.00	
		2	51.00	
		3	51.00	
		4	49.00	
		5	48.00	
	2007	1	51.00	
		2	51.00	
		3	49.00	
		4	50.00	
		5	49.00	
		6	48.00	
		7	51.00	
		8	49.00	
		9	50.00	
	2008	1	49.00	
		2	50.00	
		3	50.00	
		4	51.00	
		5	47.00	
		6	48.00	
		7	50.00	
		8	50.00	
		9	48.00	
	2009	1	51.00	
		2	50.00	
		3	49.00	
		4	50.00	
		5	49.00	
		6	48.00	
47	Number of Years	Number of Outages	Total Time (hours)	
	10	70	3500.00	1.34056013

Component **48**	**Generator (100MW)** **Bus 7**			**Std. Dev.** *1.53226176*
	Year	Outage	Time (hours)	
48	2000	1	46.00	
		2	51.00	
		3	51.00	
		4	53.00	
		5	52.00	
		6	49.00	
		7	48.00	
		8	50.00	
		9	51.00	
		10	54.00	
		11	53.00	
		12	49.00	
	2001	1	50.00	
		2	51.00	
		3	47.00	
		4	50.00	
		5	53.00	
		6	51.00	
		7	49.00	
		8	50.00	
		9	51.00	
		10	51.00	
		11	49.00	
		12	50.00	
		13	50.00	
	2002	1	48.00	
		2	50.00	
		3	51.00	
		4	51.00	
		5	50.00	
	2003	1	50.00	
		2	45.00	
	2004	1	50.00	
		2	51.00	
		3	50.00	
		4	48.00	
		5	50.00	
		6	51.00	
	2005	1	49.00	
		2	50.00	
		3	49.00	
		4	50.00	
		5	51.00	
		6	50.00	
		7	50.00	
		8	51.00	
		9	47.00	
		10	48.00	
	2006	1	50.00	
		2	50.00	
		3	51.00	
		4	50.00	
		5	48.00	
		6	50.00	
		7	50.00	
		8	50.00	
	2007	1	51.00	
		2	52.00	
	2008	1	49.00	
		2	51.00	
		3	50.00	
		4	50.00	
		5	51.00	
		6	51.00	
		7	49.00	
		8	48.00	
	2009	1	49.00	
		2	50.00	
		3	50.00	
		4	51.00	
48	Number of Years	Number of Outages	Total Time (hours)	
	10	70	3500.00	1.532261755



Component 49	Generator (100MW) Bus 7			Std. Dev. 1.560379
	Year	Outage	Time (hours)	
49	2000	1	51.00	
		2	52.00	
		3	52.00	
		4	51.00	
		5	51.00	
		6	53.00	
		7	52.00	
		8	50.00	
		9	51.00	
		10	47.00	
	2001	1	48.00	
		2	53.00	
	2002	1	50.00	
		2	53.00	
	2003	1	51.00	
		2	49.00	
	2004	1	50.00	
		2	51.00	
		3	51.00	
		4	49.00	
	2005	1	50.00	
		2	50.00	
		3	47.00	
		4	48.00	
		5	53.00	
		6	51.00	
		7	49.00	
		8	49.00	
		9	50.00	
	2006	1	49.00	
		2	48.00	
		3	51.00	
		4	51.00	
		5	45.00	
		6	47.00	
		7	49.00	
		8	48.00	
		9	51.00	
		10	50.00	
		11	49.00	
		12	48.00	
		13	50.00	
	2007	1	51.00	
		2	51.00	
		3	53.00	
		4	49.00	
		5	50.00	
		6	51.00	
		7	50.00	
		8	50.00	
		9	50.00	
		10	50.00	
		11	51.00	
		12	50.00	
		13	49.00	
	2008	1	51.00	
		2	50.00	
		3	50.00	
		4	51.00	
		5	51.00	
		6	49.00	
		7	48.00	
		8	50.00	
		9	51.00	
		10	49.00	
		11	50.00	
	2009	1	50.00	
		2	49.00	
		3	48.00	
		4	50.00	
49	Number of Years	Number of Outages	Total Time (hours)	
	10	70	3500.00	1.560378995

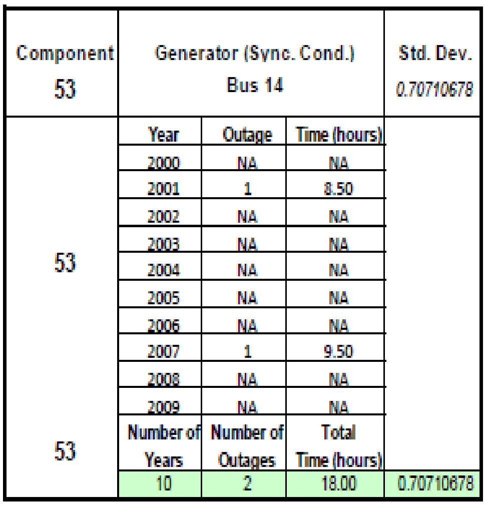


Component 71	Generator (350MW) Bus 23			Std. Dev. 1.37260991
	Year	Outage	Time (hours)	
71	2000	1	100.00	
		2	101.00	
		3	102.00	
		4	100.00	
		5	101.00	
		6	99.00	
		7	98.00	
		8	101.00	
		9	100.00	
	2001	1	99.00	
		2	101.00	
		3	99.00	
		4	98.00	
		5	99.00	
		6	98.00	
		7	100.00	
		8	102.00	
	2002	1	101.00	
		2	102.00	
		3	100.00	
		4	101.00	
		5	99.00	
		6	98.00	
		7	101.00	
		8	100.00	
	2003	1	99.00	
		2	101.00	
		3	99.00	
		4	98.00	
		5	99.00	
		6	98.00	
	2004	1	99.00	
		2	98.00	
		3	100.00	
		4	102.00	
		5	101.00	
		6	102.00	
		7	100.00	
		8	101.00	
		9	99.00	
	2005	1	102.00	
		2	100.00	
		3	102.00	
		4	101.00	
		5	102.00	
		6	100.00	
		7	101.00	
		8	99.00	
	2006	1	98.00	
		2	101.00	
		3	100.00	
		4	102.00	
		5	101.00	
		6	99.00	
	2007	1	98.00	
		2	99.00	
		3	98.00	
		4	99.00	
		5	98.00	
		6	100.00	
		7	98.00	
		8	100.00	
	2008	1	102.00	
		2	101.00	
		3	102.00	
	2009	1	100.00	
		2	101.00	
		3	98.00	
		4	100.00	
		5	102.00	
71	Number of Years	Number of Outages	Total Time (hours)	
	10	70	7000.00	1.372609912

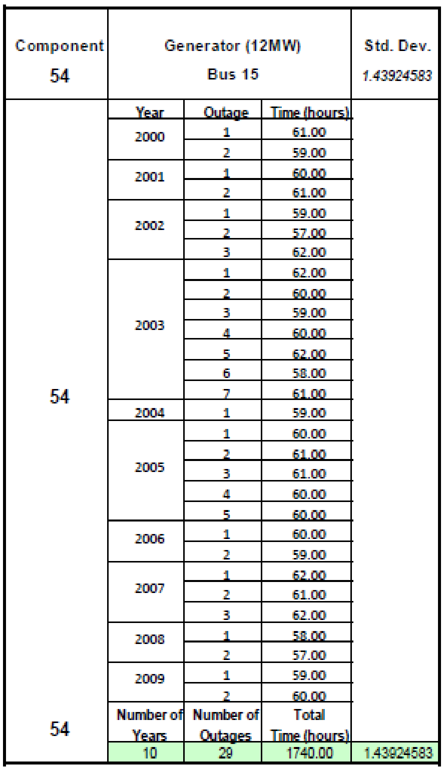
Component 50	Generator (197MW) Bus 13			Std. Dev. 1.24105998
	Year	Outage	Time (hours)	
50	2000	1	51.00	
		2	50.00	
		3	48.00	
		4	50.00	
		5	51.00	
		6	49.00	
		7	50.00	
		8	49.00	
		9	50.00	
		10	51.00	
		11	50.00	
		12	50.00	
		13	51.00	
		14	51.00	
	2001	1	49.00	
		2	50.00	
		3	51.00	
		4	51.00	
		5	49.00	
		6	50.00	
		7	50.00	
		8	48.00	
		9	50.00	
		10	51.00	
		11	51.00	
		12	50.00	
		13	50.00	
		14	48.00	
		15	53.00	
		16	51.00	
		17	49.00	
	2002	1	49.00	
		2	50.00	
		3	49.00	
	2003	1	48.00	
		2	51.00	
		3	51.00	
		4	45.00	
		5	51.00	
		6	47.00	
		7	48.00	
		8	50.00	
		9	50.00	
		10	51.00	
		11	50.00	
		12	48.00	
		13	50.00	
		14	50.00	
		15	50.00	
		16	52.00	
		17	49.00	
		18	48.00	
		19	51.00	
	2004	1	50.00	
		2	51.00	
		3	51.00	
		4	49.00	
		5	50.00	
		6	48.00	
		7	50.00	
		8	50.00	
		9	51.00	
		10	51.00	
		11	53.00	
		12	51.00	
	2005	1	50.00	
		2	51.00	
		3	50.00	
		4	48.00	
		5	50.00	
		6	50.00	
	2006	1	51.00	
		2	50.00	
		3	51.00	
		4	50.00	
		5	50.00	
		6	50.00	
		7	51.00	
		8	52.00	
		9	49.00	
		10	51.00	
		11	49.00	
		12	50.00	
	2007	1	50.00	
		2	50.00	
	2008	1	50.00	
		2	51.00	
	2009	1	51.00	
50	Number of Years	Number of Outages	Total Time (hours)	
	10	88	4400.00	1.24105998

Component 51	Generator (197MW) Bus 13			Std. Dev. 1.4383899
	Year	Outage	Time (hours)	
51	2000	1	48.00	
		2	53.00	
		3	51.00	
		4	49.00	
		5	49.00	
		6	50.00	
		7	49.00	
		8	48.00	
		9	51.00	
		10	51.00	
	2001	1	45.00	
		2	47.00	
		3	49.00	
		4	48.00	
		5	51.00	
		6	50.00	
		7	49.00	
		8	53.00	
		9	50.00	
		10	51.00	
		11	51.00	
		12	53.00	
		13	50.00	
		14	48.00	
	2002	1	50.00	
		2	51.00	
		3	49.00	
		4	50.00	
		5	49.00	
		6	50.00	
		7	51.00	
		8	50.00	
		9	50.00	
		10	51.00	
		11	47.00	
		12	48.00	
		13	50.00	
		14	50.00	
		15	51.00	
		16	50.00	
	2003	1	48.00	
		2	51.00	
		3	51.00	
		4	49.00	
		5	50.00	
		6	50.00	
		7	50.00	
		8	50.00	
		9	51.00	
		10	51.00	
		11	50.00	
		12	50.00	
		13	51.00	
		14	51.00	
		15	51.00	
		16	50.00	
		17	52.00	
		18	50.00	
		19	50.00	
	2004	1	51.00	
		2	51.00	
		3	53.00	
		4	51.00	
		5	50.00	
		6	51.00	
		7	50.00	
		8	48.00	
		9	50.00	
		10	50.00	
		11	49.00	
	2005	1	50.00	
		2	51.00	
		3	51.00	
		4	50.00	
		5	50.00	
		6	45.00	
		7	50.00	
	2006	1	51.00	
		2	50.00	
		3	52.00	
		4	50.00	
		5	51.00	
	2007	1	49.00	
		2	48.00	
	2008	1	50.00	
		2	50.00	
	2009	1	51.00	
		2	50.00	
51	Number of Years	Number of Outages	Total Time (hours)	
	10	88	4400.00	1.438389904

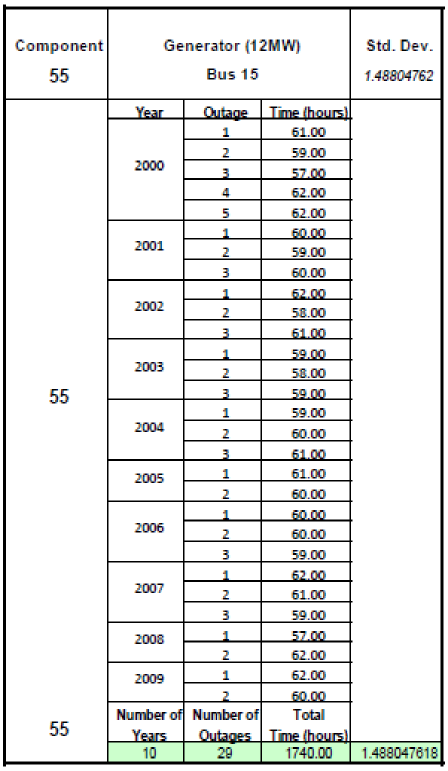
Component 52	Generator (197MW) Bus 13			Std. Dev. 1.12444111
	Year	Outage	Time (hours)	
52	2000	1	51.00	
		2	50.00	
		3	50.00	
		4	53.00	
		5	49.00	
		6	49.00	
		7	51.00	
		8	51.00	
		9	53.00	
		10	51.00	
		11	51.00	
		12	49.00	
		13	48.00	
		14	52.00	
		15	49.00	
		16	48.00	
		17	51.00	
		18	50.00	
		19	51.00	
	2001	1	51.00	
		2	49.00	
		3	50.00	
		4	48.00	
		5	50.00	
		6	51.00	
		7	50.00	
	2002	1	48.00	
		2	51.00	
		3	51.00	
	2003	1	49.00	
		2	50.00	
		3	50.00	
		4	48.00	
		5	50.00	
		6	51.00	
		7	51.00	
		8	50.00	
		9	50.00	
	2004	1	51.00	
		2	48.00	
		3	51.00	
	2005	1	50.00	
		2	50.00	
		3	50.00	
		4	51.00	
		5	51.00	
		6	49.00	
		7	50.00	
		8	51.00	
		9	51.00	
		10	49.00	
		11	50.00	
	2006	1	50.00	
		2	48.00	
		3	50.00	
		4	51.00	
		5	48.00	
		6	51.00	
		7	49.00	
		8	51.00	
		9	50.00	
		10	51.00	
		11	50.00	
		12	48.00	
		13	50.00	
	2007	1	50.00	
		2	51.00	
		3	50.00	
		4	51.00	
		5	48.00	
		6	50.00	
	2008	1	50.00	
		2	51.00	
		3	49.00	
		4	50.00	
		5	48.00	
		6	50.00	
		7	50.00	
		8	51.00	
		9	49.00	
		10	50.00	
		11	50.00	
		12	50.00	
		13	50.00	
		14	51.00	
		15	48.00	
	2009	1	49.00	
		2	50.00	
52	Number of Years	Number of Outages	Total Time (hours)	
	10	88	4400.00	1.124441113



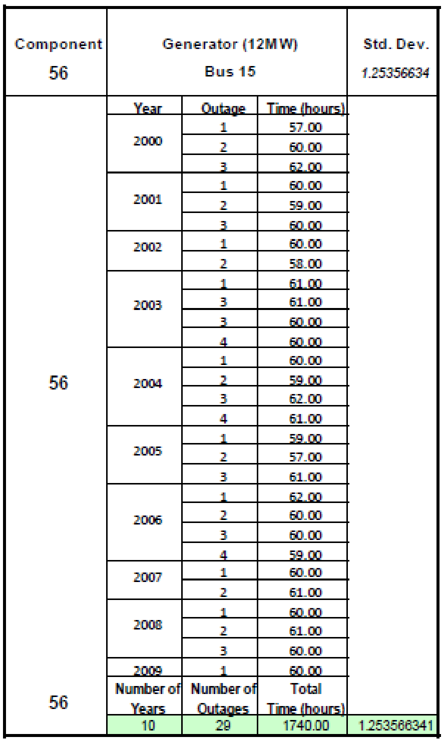
Component 53	Generator (Sync. Cond.) Bus 14			Std. Dev. 0.70710678
53	Year	Outage	Time (hours)	
	2000	NA	NA	
	2001	1	8.50	
	2002	NA	NA	
	2003	NA	NA	
	2004	NA	NA	
	2005	NA	NA	
	2006	NA	NA	
	2007	1	9.50	
	2008	NA	NA	
	2009	NA	NA	
53	Number of Years	Number of Outages	Total Time (hours)	
	10	2	18.00	0.70710678



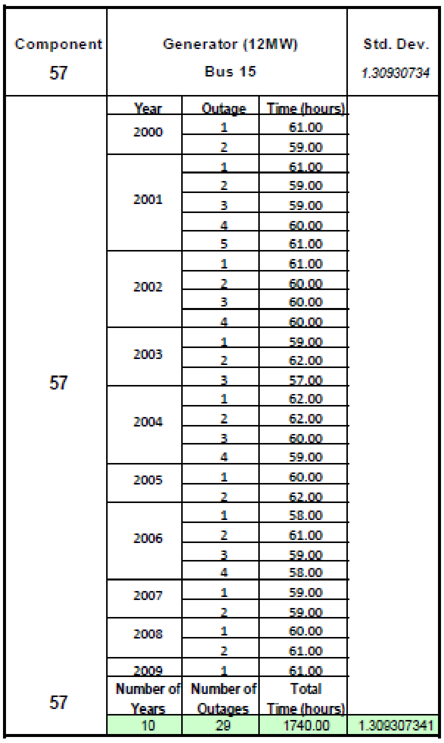
Component 54	Generator (12MW) Bus 15			Std. Dev. 1.43924583
54	Year	Outage	Time (hours)	
	2000	1	61.00	
		2	59.00	
	2001	1	60.00	
		2	61.00	
	2002	1	59.00	
		2	57.00	
		3	62.00	
	2003	1	62.00	
		2	60.00	
		3	59.00	
		4	60.00	
		5	62.00	
		6	58.00	
		7	61.00	
	2004	1	59.00	
	2005	1	60.00	
		2	61.00	
		3	61.00	
		4	60.00	
		5	60.00	
	2006	1	60.00	
		2	59.00	
	2007	1	62.00	
		2	61.00	
		3	62.00	
	2008	1	58.00	
		2	57.00	
	2009	1	59.00	
		2	60.00	
54	Number of Years	Number of Outages	Total Time (hours)	
	10	29	1740.00	1.43924583



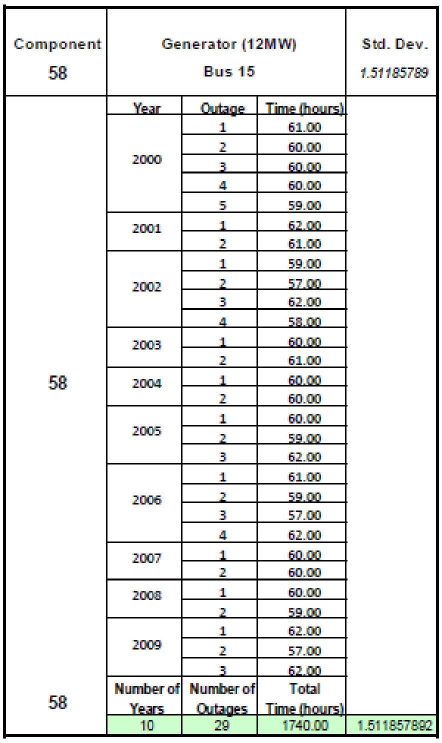
Component 55	Generator (12MW) Bus 15			Std. Dev. 1.48804762
55	Year	Outage	Time (hours)	
	2000	1	61.00	
		2	59.00	
		3	57.00	
		4	62.00	
		5	62.00	
	2001	1	60.00	
		2	59.00	
		3	60.00	
	2002	1	62.00	
		2	58.00	
		3	61.00	
	2003	1	59.00	
		2	58.00	
		3	59.00	
	2004	1	59.00	
		2	60.00	
		3	61.00	
	2005	1	61.00	
		2	60.00	
	2006	1	60.00	
		2	60.00	
		3	59.00	
	2007	1	62.00	
		2	61.00	
		3	59.00	
	2008	1	57.00	
		2	62.00	
	2009	1	62.00	
		2	60.00	
55	Number of Years	Number of Outages	Total Time (hours)	
	10	29	1740.00	1.488047618



Component 56	Generator (12MW) Bus 15			Std. Dev. 1.25356634
56	Year	Outage	Time (hours)	
	2000	1	57.00	
		2	60.00	
		3	62.00	
	2001	1	60.00	
		2	59.00	
		3	60.00	
	2002	1	60.00	
		2	58.00	
	2003	1	61.00	
		3	61.00	
		3	60.00	
		4	60.00	
	2004	1	60.00	
		2	59.00	
		3	62.00	
		4	61.00	
	2005	1	59.00	
		2	57.00	
		3	61.00	
	2006	1	62.00	
		2	60.00	
		3	60.00	
		4	59.00	
	2007	1	60.00	
		2	61.00	
	2008	1	60.00	
		2	61.00	
		3	60.00	
	2009	1	60.00	
56	Number of Years	Number of Outages	Total Time (hours)	
	10	29	1740.00	1.253566341



Component 57	Generator (12MW) Bus 15			Std. Dev. 1.30930734
57	Year	Outage	Time (hours)	
	2000	1	61.00	
		2	59.00	
	2001	1	61.00	
		2	59.00	
		3	59.00	
		4	60.00	
		5	61.00	
	2002	1	61.00	
		2	60.00	
		3	60.00	
		4	60.00	
	2003	1	59.00	
		2	62.00	
		3	57.00	
	2004	1	62.00	
		2	62.00	
		3	60.00	
		4	59.00	
	2005	1	60.00	
		2	62.00	
	2006	1	58.00	
		2	61.00	
		3	59.00	
		4	58.00	
	2007	1	59.00	
		2	59.00	
	2008	1	60.00	
		2	61.00	
	2009	1	61.00	
57	Number of Years	Number of Outages	Total Time (hours)	
	10	29	1740.00	1.309307341



Component 58	Generator (12MW) Bus 15			Std. Dev. 1.51185789
58	Year	Outage	Time (hours)	
	2000	1	61.00	
		2	60.00	
		3	60.00	
		4	60.00	
		5	59.00	
	2001	1	62.00	
		2	61.00	
	2002	1	59.00	
		2	57.00	
		3	62.00	
		4	58.00	
	2003	1	60.00	
		2	61.00	
	2004	1	60.00	
		2	60.00	
	2005	1	60.00	
		2	59.00	
		3	62.00	
	2006	1	61.00	
		2	59.00	
		3	57.00	
		4	62.00	
	2007	1	60.00	
		2	60.00	
	2008	1	60.00	
		2	59.00	
	2009	1	62.00	
		2	57.00	
		3	62.00	
58	Number of Years	Number of Outages	Total Time (hours)	
	10	29	1740.00	1.511857892

Component 59	Generator (155MW) Bus 15			Std. Dev. *1.02833422*
	Year	Outage	Time (hours)	
59	2000	1	41.00	
		2	39.00	
		3	40.00	
		4	39.00	
		5	40.00	
		6	40.00	
		7	40.00	
		8	41.00	
		9	41.00	
		10	40.00	
		11	40.00	
		12	39.00	
		13	43.00	
	2001	1	39.00	
		2	38.00	
		3	39.00	
		4	40.00	
		5	40.00	
		6	41.00	
	2002	1	41.00	
		2	40.00	
		3	41.00	
		4	39.00	
	2003	1	39.00	
		2	38.00	
		3	39.00	
		4	38.00	
		5	39.00	
		6	40.00	
		7	40.00	
		8	41.00	
		9	40.00	
		10	40.00	
		11	40.00	
		12	41.00	
		13	41.00	
		14	40.00	
		15	40.00	
		16	39.00	
		17	43.00	
		18	39.00	
	2004	1	38.00	
		2	39.00	
		3	40.00	
		4	40.00	
		5	41.00	
	2005	1	41.00	
		2	41.00	
		3	41.00	
		4	40.00	
		5	41.00	
		6	39.00	
		7	39.00	
		8	40.00	
		9	39.00	
		10	40.00	
		11	39.00	
		12	40.00	
	2006	1	40.00	
		2	41.00	
		3	40.00	
		4	40.00	
		5	41.00	
		6	41.00	
		7	41.00	
		8	40.00	
		9	40.00	
		10	39.00	
		11	42.00	
		12	39.00	
		13	38.00	
		14	39.00	
		15	40.00	
		16	40.00	
	2007	1	41.00	
		2	41.00	
		3	41.00	
		4	41.00	
	2008	1	40.00	
		2	41.00	
		3	39.00	
		4	41.00	
		5	38.00	
		6	39.00	
	2009	1	40.00	
		2	40.00	
		3	41.00	
		4	40.00	
59	Number of Years	Number of Outages	Total Time (hours)	
	10	88	3520.00	1.02833422

Component 60	Generator (155MW) Bus 16			Std. Dev. *1.05045146*
	Year	Outage	Time (hours)	
60	2000	1	39.00	
		2	40.00	
		3	40.00	
		4	41.00	
		5	41.00	
		6	40.00	
		7	41.00	
		8	39.00	
		9	39.00	
		10	38.00	
		11	39.00	
		12	38.00	
	2001	1	39.00	
		2	40.00	
		3	40.00	
		4	41.00	
		5	40.00	
		6	40.00	
		7	39.00	
		8	41.00	
		9	41.00	
		10	40.00	
		11	40.00	
		12	39.00	
		13	40.00	
	2002	1	40.00	
		2	40.00	
		3	41.00	
		4	41.00	
		5	40.00	
	2003	1	40.00	
		2	39.00	
		3	43.00	
		4	39.00	
		5	38.00	
		6	39.00	
		7	40.00	
	2004	1	40.00	
		2	41.00	
		3	41.00	
		4	40.00	
		5	41.00	
		6	40.00	
		7	40.00	
		8	41.00	
		9	41.00	
		10	40.00	
		11	41.00	
		12	39.00	
		13	39.00	
		14	38.00	
		15	39.00	
	2005	1	38.00	
		2	39.00	
		3	40.00	
		4	40.00	
		5	41.00	
		6	40.00	
		7	41.00	
		8	41.00	
		9	40.00	
		10	40.00	
		11	39.00	
		12	43.00	
	2006	1	39.00	
		2	38.00	
		3	39.00	
		4	40.00	
		5	40.00	
		6	41.00	
		7	41.00	
		8	40.00	
		9	41.00	
	2007	1	41.00	
		2	41.00	
		3	41.00	
		4	40.00	
		5	41.00	
		6	39.00	
	2008	1	41.00	
		2	38.00	
		3	39.00	
		4	40.00	
		5	40.00	
		6	41.00	
		7	40.00	
	2009	1	39.00	
		2	42.00	
60	Number of Years	Number of Outages	Total Time (hours)	
	10	88	3520.00	1.050451463

Component 69	Generator (155MW) Bus 23			Std. Dev. *1.07211253*
	Year	Outage	Time (hours)	
69	2000	1	40.00	
		2	40.00	
		3	41.00	
		4	41.00	
		5	41.00	
		6	40.00	
		7	40.00	
		8	39.00	
		9	42.00	
		10	39.00	
		11	38.00	
		12	39.00	
	2001	1	40.00	
		2	40.00	
		3	41.00	
		4	41.00	
		5	41.00	
		6	41.00	
		7	40.00	
		8	41.00	
		9	39.00	
		10	41.00	
		11	38.00	
		12	39.00	
		13	40.00	
		14	41.00	
		15	41.00	
	2002	1	40.00	
		2	41.00	
		3	39.00	
		4	39.00	
		5	38.00	
		6	39.00	
		7	38.00	
		8	39.00	
		9	40.00	
		10	40.00	
		11	41.00	
	2003	1	40.00	
		2	41.00	
		3	41.00	
		4	40.00	
		5	40.00	
		6	39.00	
		7	43.00	
		8	40.00	
		9	41.00	
	2004	1	41.00	
		2	40.00	
		3	41.00	
		4	41.00	
		5	41.00	
		6	41.00	
		7	40.00	
		8	41.00	
		9	39.00	
		10	40.00	
		11	38.00	
		12	39.00	
	2005	1	40.00	
		2	40.00	
		3	41.00	
		4	40.00	
		5	39.00	
		6	40.00	
	2006	1	41.00	
		2	41.00	
		3	40.00	
		4	40.00	
		5	39.00	
		6	43.00	
		7	39.00	
		8	38.00	
		9	39.00	
	2007	1	40.00	
		2	40.00	
		3	41.00	
		4	38.00	
		5	40.00	
	2008	1	40.00	
		2	40.00	
		3	41.00	
		4	38.00	
		5	40.00	
	2009	1	40.00	
		2	39.00	
		3	39.00	
		4	39.00	
69	Number of Years	Number of Outages	Total Time (hours)	
	10	88	3520.00	1.072112535

Component 70	Generator (155MW) Bus 23			Std. Dev. *0.9589266*
	Year	Outage	Time (hours)	
70	2000	1	40.00	
		2	40.00	
		3	41.00	
		4	40.00	
		5	41.00	
		6	41.00	
		7	40.00	
		8	40.00	
		9	39.00	
		10	43.00	
		11	39.00	
		12	38.00	
		13	39.00	
		14	40.00	
		15	40.00	
		16	41.00	
		17	41.00	
	2001	1	40.00	
		2	41.00	
		3	41.00	
		4	41.00	
		5	41.00	
		6	40.00	
		7	41.00	
		8	39.00	
		9	41.00	
	2002	1	38.00	
		2	39.00	
		3	39.00	
		4	40.00	
		5	40.00	
		6	41.00	
		7	38.00	
		8	40.00	
		9	40.00	
		10	40.00	
		11	41.00	
		12	38.00	
	2003	1	40.00	
		2	40.00	
		3	39.00	
		4	39.00	
		5	39.00	
		6	39.00	
		7	38.00	
		8	39.00	
		9	38.00	
		10	39.00	
	2004	1	40.00	
		2	40.00	
		3	41.00	
		4	40.00	
		5	40.00	
		6	39.00	
		7	41.00	
		8	41.00	
		9	40.00	
		10	41.00	
	2005	1	41.00	
		2	40.00	
		3	40.00	
		4	41.00	
		5	39.00	
		6	39.00	
		7	40.00	
		8	39.00	
	2006	1	40.00	
		2	39.00	
		3	40.00	
		4	40.00	
		5	41.00	
		6	40.00	
		7	40.00	
	2007	1	41.00	
		2	41.00	
		3	41.00	
		4	40.00	
		5	40.00	
	2008	1	41.00	
		2	41.00	
		3	40.00	
		4	41.00	
		5	39.00	
		6	40.00	
		7	39.00	
		8	40.00	
	2009	1	41.00	
		2	41.00	
70	Number of Years	Number of Outages	Total Time (hours)	
	10	88	3520.00	0.958926603

Component 61	Generator (400MW) Bus 18			Std. Dev. 1.56963949
	Year	Outage	Time (hours)	
61	2000	1	150.00	
	2001	1	151.00	
		2	149.00	
		3	148.00	
		4	149.00	
		5	151.00	
		6	152.00	
		7	148.00	
		8	153.00	
		9	149.00	
		10	149.00	
		11	148.00	
		12	149.00	
		13	149.00	
		14	147.00	
		15	151.00	
		16	151.00	
		17	152.00	
		18	149.00	
		19	149.00	
		20	151.00	
		21	149.00	
		22	151.00	
		23	152.00	
	2002	1	148.00	
		2	153.00	
	2003	1	149.00	
		2	149.00	
		3	151.00	
	2004	1	149.00	
		2	149.00	
		3	152.00	
		4	149.00	
		5	149.00	
		6	151.00	
		7	149.00	
		8	151.00	
		9	152.00	
		10	149.00	
		11	149.00	
		12	152.00	
	2005	1	149.00	
		2	149.00	
		3	147.00	
		4	151.00	
		5	151.00	
	2006	1	152.00	
		2	149.00	
		3	149.00	
		4	149.00	
		5	151.00	
	2007	1	149.00	
		2	151.00	
		3	152.00	
		4	148.00	
		5	153.00	
		6	153.00	
		7	149.00	
		8	149.00	
		9	149.00	
		10	147.00	
	2008	1	151.00	
		2	151.00	
		3	152.00	
		4	149.00	
		5	149.00	
		6	151.00	
		7	151.00	
	2009	1	152.00	
		2	149.00	
61	Number of Years	Number of Outages	Total Time (hours)	
	10	70	10500.00	1.56963949

Component 62	Generator (400MW) Bus 21			Std. Dev. 1.54169115
	Year	Outage	Time (hours)	
62	2000	1	151.00	
		2	152.00	
		3	149.00	
		4	149.00	
		5	151.00	
		6	149.00	
		7	151.00	
		8	152.00	
		9	148.00	
		10	153.00	
		11	149.00	
		12	149.00	
		13	151.00	
		14	149.00	
		15	149.00	
		16	152.00	
		17	149.00	
	2001	1	149.00	
		2	151.00	
		3	149.00	
		4	153.00	
		5	149.00	
	2002	1	149.00	
		2	151.00	
		3	149.00	
		4	149.00	
		5	152.00	
		6	149.00	
	2003	1	149.00	
		2	151.00	
		3	149.00	
		4	151.00	
		5	152.00	
		6	149.00	
		7	149.00	
	2004	1	152.00	
		2	149.00	
		3	149.00	
		4	147.00	
		5	151.00	
		6	151.00	
		7	152.00	
		8	149.00	
	2005	1	147.00	
		2	151.00	
		3	151.00	
		4	152.00	
		5	149.00	
		6	149.00	
		7	151.00	
		8	149.00	
		9	151.00	
	2006	1	152.00	
		2	148.00	
		3	153.00	
		4	149.00	
		5	150.00	
		6	151.00	
		7	149.00	
		8	149.00	
		9	149.00	
		10	152.00	
		11	149.00	
		12	149.00	
	2007	1	147.00	
		2	151.00	
	2008	1	151.00	
		2	152.00	
		3	149.00	
	2009	1	147.00	
62	Number of Years	Number of Outages	Total Time (hours)	
	10	70	10500.00	1.541691147

Component **63**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.22971343*
	Year	Outage	Time (hours)	
63	2000	1	21.00	
		2	21.00	
		3	20.00	
		4	21.00	
		5	20.00	
		6	19.00	
		7	18.00	
		8	20.00	
	2001	1	19.00	
		2	21.00	
		3	20.00	
		4	20.00	
	2002	1	19.00	
		2	23.00	
		3	21.00	
	2003	1	22.00	
		2	21.00	
		3	20.00	
		4	19.00	
	2004	1	18.00	
		2	20.00	
		3	19.00	
		4	21.00	
	2005	1	20.00	
		2	19.00	
		3	20.00	
		4	19.00	
		5	21.00	
	2006	1	20.00	
		2	20.00	
		3	19.00	
		4	18.00	
		5	17.00	
	2007	1	22.00	
		2	21.00	
		3	20.00	
	2008	1	21.00	
		2	20.00	
	2009	1	19.00	
		2	22.00	
		3	20.00	
		4	19.00	
63	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.22971343

Component **64**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.22971343*
	Year	Outage	Time (hours)	
64	2000	1	19.00	
		2	21.00	
		3	20.00	
		4	19.00	
		5	20.00	
		6	19.00	
	2001	1	21.00	
		2	20.00	
		3	20.00	
		4	19.00	
		5	18.00	
		6	17.00	
	2002	1	22.00	
		2	21.00	
		3	20.00	
		4	21.00	
	2003	1	20.00	
		2	19.00	
		3	22.00	
		4	20.00	
		5	19.00	
	2004	1	18.00	
		2	20.00	
		3	19.00	
		4	21.00	
		5	20.00	
	2005	1	20.00	
		2	19.00	
		3	23.00	
		4	21.00	
	2006	1	22.00	
		2	21.00	
		3	20.00	
	2007	1	19.00	
		2	18.00	
	2008	1	20.00	
		2	19.00	
		3	21.00	
		4	21.00	
	2009	1	21.00	
		2	20.00	
		3	20.00	
64	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.229713431

Component **65**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.28784183*
	Year	Outage	Time (hours)	
65	2000	1	20.00	
		2	20.00	
		3	19.00	
		4	23.00	
	2001	1	21.00	
		2	22.00	
		3	21.00	
		4	20.00	
	2002	1	19.00	
		2	18.00	
		3	20.00	
		4	19.00	
	2003	1	21.00	
		2	20.00	
		3	19.00	
	2004	1	20.00	
		2	19.00	
		3	21.00	
		4	20.00	
		5	20.00	
		6	19.00	
		7	18.00	
	2005	1	20.00	
		2	19.00	
		3	21.00	
		4	20.00	
		5	20.00	
		6	19.00	
	2006	1	18.00	
		2	17.00	
		3	22.00	
		4	21.00	
		5	20.00	
	2007	1	19.00	
		2	20.00	
		3	20.00	
		4	19.00	
	2008	1	23.00	
		2	21.00	
		3	22.00	
	2009	1	20.00	
		2	20.00	
65	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.287841832

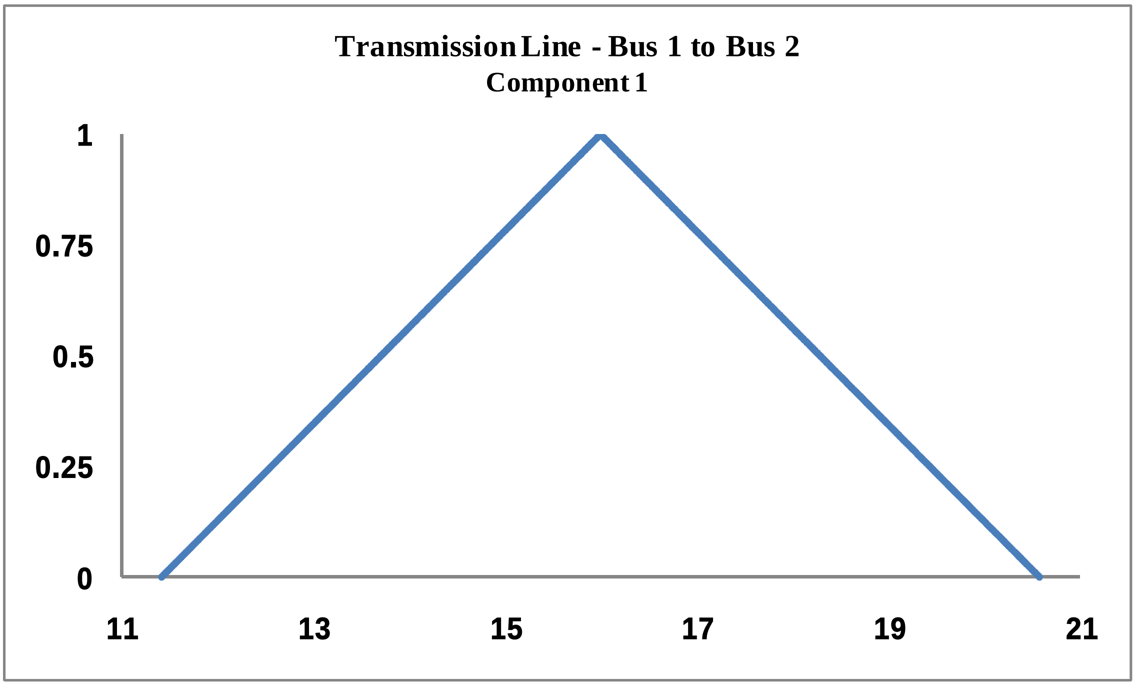
Component **66**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.28784183*
	Year	Outage	Time (hours)	
66	2000	1	18.00	
		2	17.00	
		3	22.00	
		4	21.00	
	2001	1	20.00	
		2	21.00	
		3	20.00	
	2002	1	19.00	
		2	22.00	
	2003	1	20.00	
		2	19.00	
		3	18.00	
	2004	1	20.00	
		2	19.00	
		3	21.00	
		4	20.00	
		5	20.00	
		6	19.00	
		7	20.00	
	2005	1	21.00	
		2	22.00	
		3	21.00	
		4	21.00	
	2006	1	20.00	
		2	20.00	
		3	19.00	
		4	18.00	
		5	17.00	
	2007	1	21.00	
		2	21.00	
		3	20.00	
		4	21.00	
		5	20.00	
		6	19.00	
	2008	1	22.00	
		2	20.00	
		3	20.00	
		4	19.00	
	2009	1	22.00	
		2	21.00	
		3	20.00	
		4	19.00	
66	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.287841832

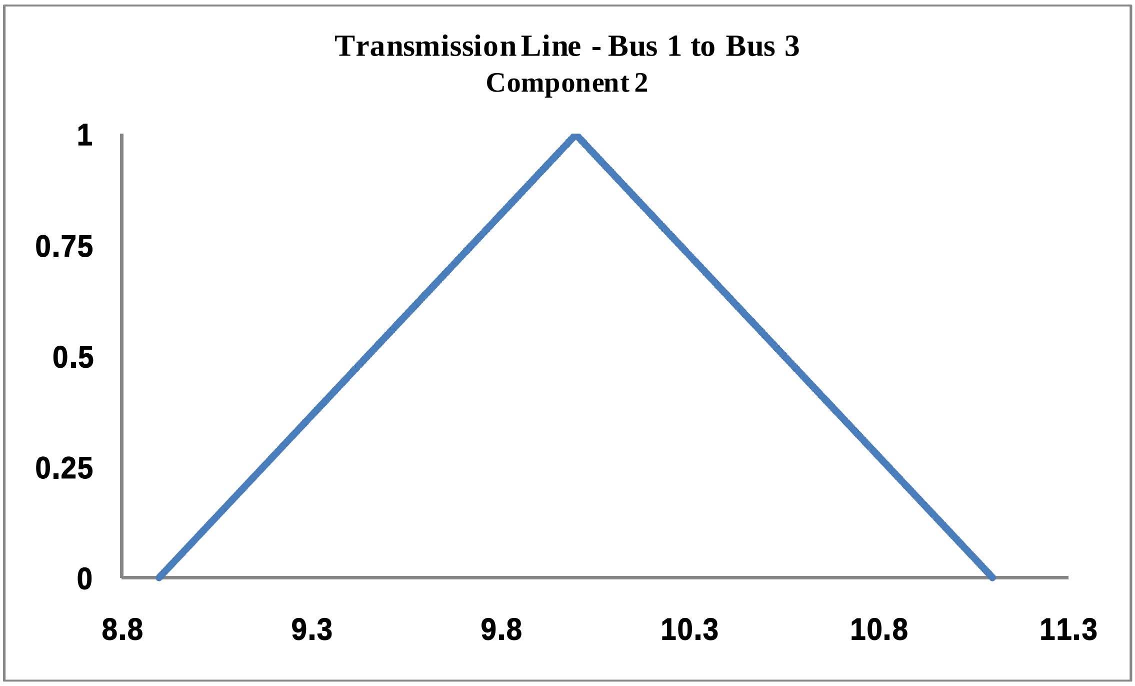
Component **67**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.26876164*
	Year	Outage	Time (hours)	
67	2000	1	17.00	
		2	22.00	
		3	21.00	
		4	20.00	
		5	21.00	
	2001	1	20.00	
		2	19.00	
		3	22.00	
		4	20.00	
	2002	1	19.00	
		2	18.00	
		3	20.00	
		4	19.00	
	2003	1	21.00	
		2	20.00	
		3	20.00	
	2004	1	19.00	
		2	23.00	
		3	21.00	
		4	21.00	
		5	20.00	
		6	19.00	
		7	18.00	
		8	20.00	
		9	19.00	
	2005	1	21.00	
		2	20.00	
	2006	1	19.00	
		2	20.00	
		3	19.00	
		4	21.00	
		5	19.00	
		6	22.00	
		7	21.00	
	2007	1	20.00	
		2	21.00	
	2008	1	20.00	
		2	19.00	
		3	22.00	
	2009	1	20.00	
		2	19.00	
		3	18.00	
67	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.268761639

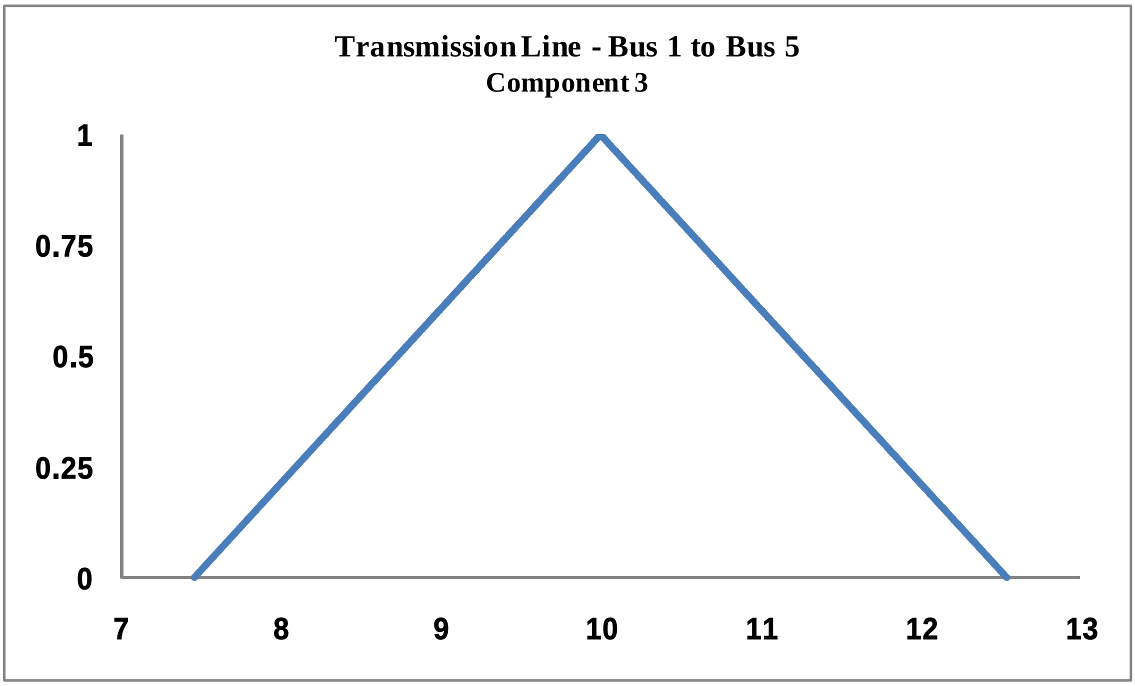
Component **68**	**Generator (50MW)** **Bus 22**			**Std. Dev.** *1.1043153*
	Year	Outage	Time (hours)	
68	2000	1	19.00	
		2	21.00	
		3	20.00	
		4	20.00	
		5	19.00	
		6	18.00	
	2001	1	17.00	
		2	22.00	
		3	21.00	
		4	20.00	
		5	21.00	
	2002	1	20.00	
		2	19.00	
		3	22.00	
		4	20.00	
		5	19.00	
	2003	1	21.00	
		2	20.00	
		3	19.00	
		4	22.00	
		5	20.00	
		6	19.00	
	2004	1	19.00	
		2	20.00	
		3	19.00	
		4	21.00	
		5	20.00	
	2005	1	20.00	
		2	19.00	
		3	20.00	
	2006	1	21.00	
		2	19.00	
		3	20.00	
		4	20.00	
	2007	1	19.00	
		2	21.00	
		3	20.00	
	2008	1	20.00	
		2	21.00	
		3	19.00	
	2009	1	22.00	
		2	21.00	
68	**Number of Years**	**Number of Outages**	**Total Time (hours)**	
	10	42	840.00	1.10431526

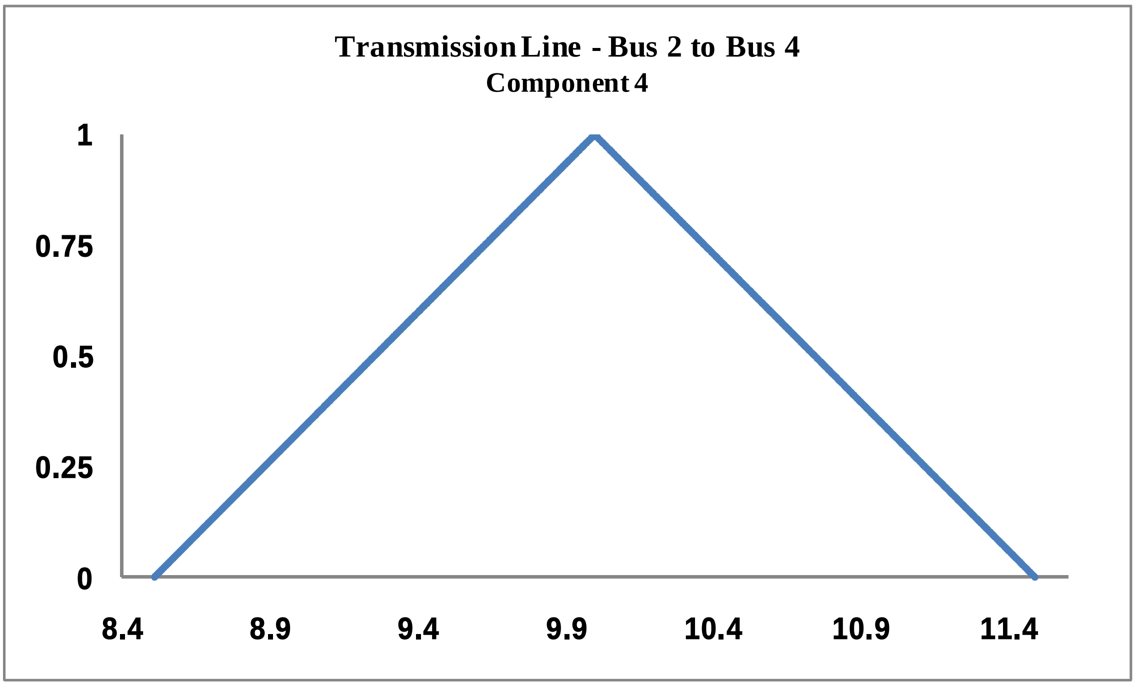
Annex 4

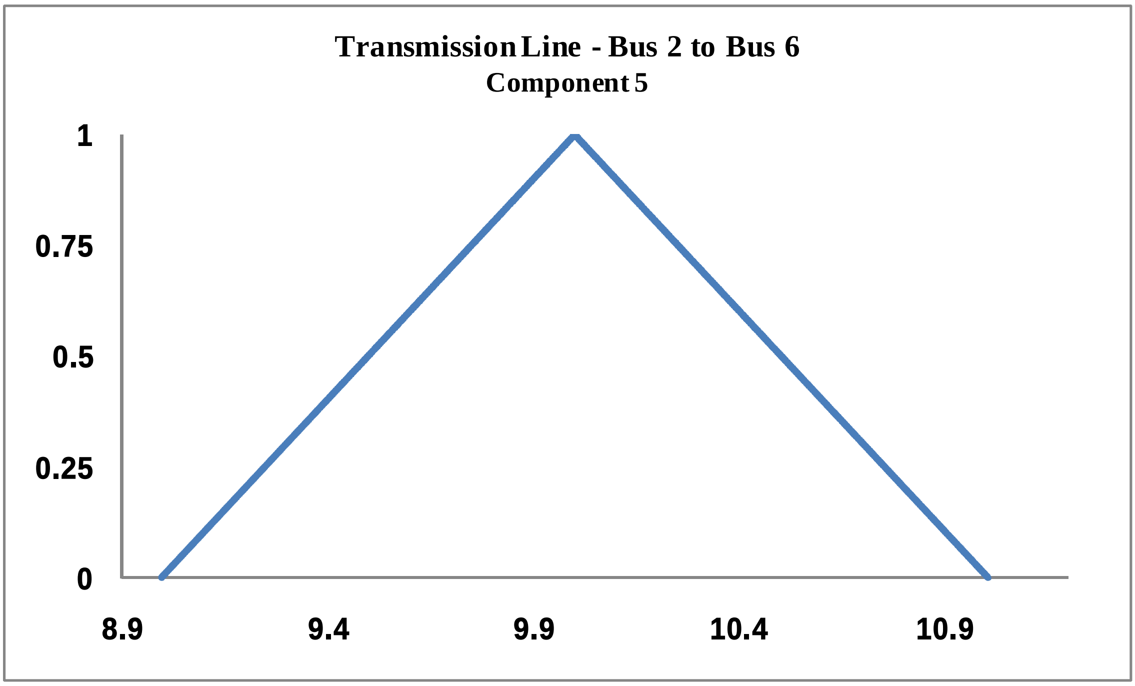
Fuzzy membership functions for Repair Time (hours per failure)

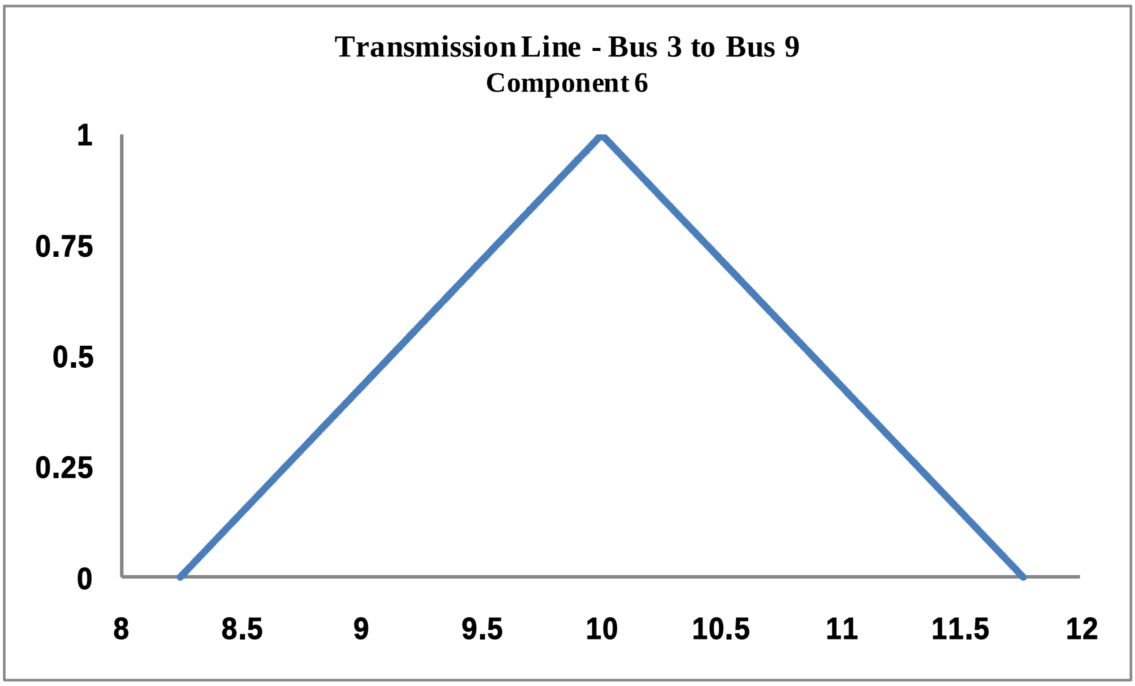


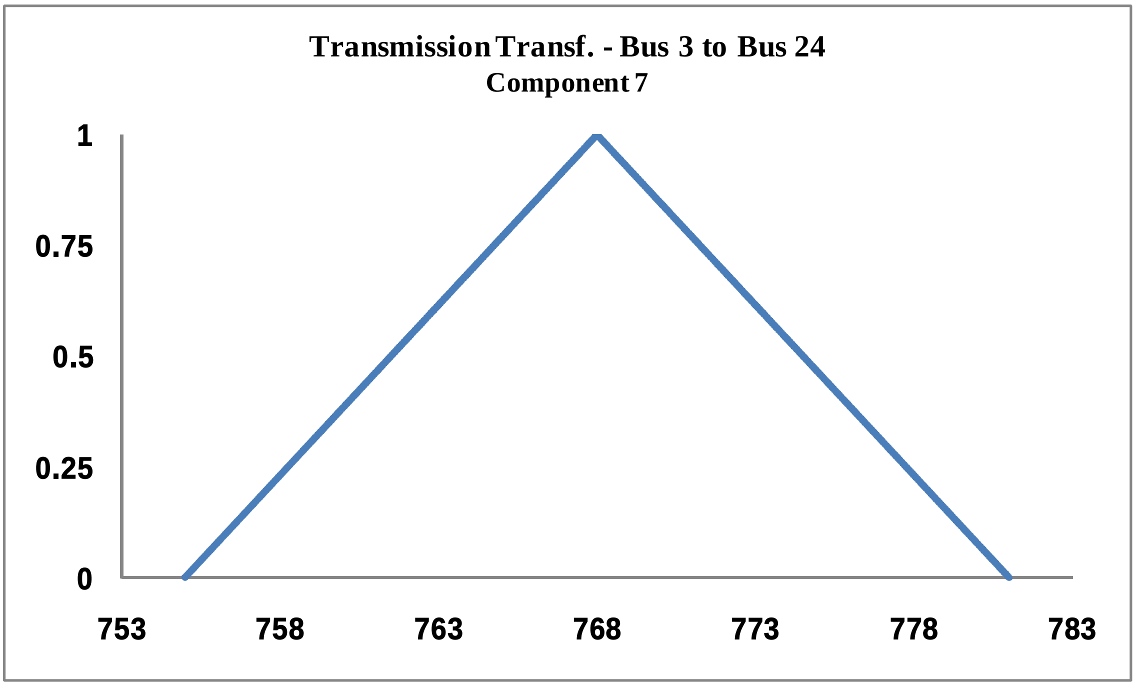


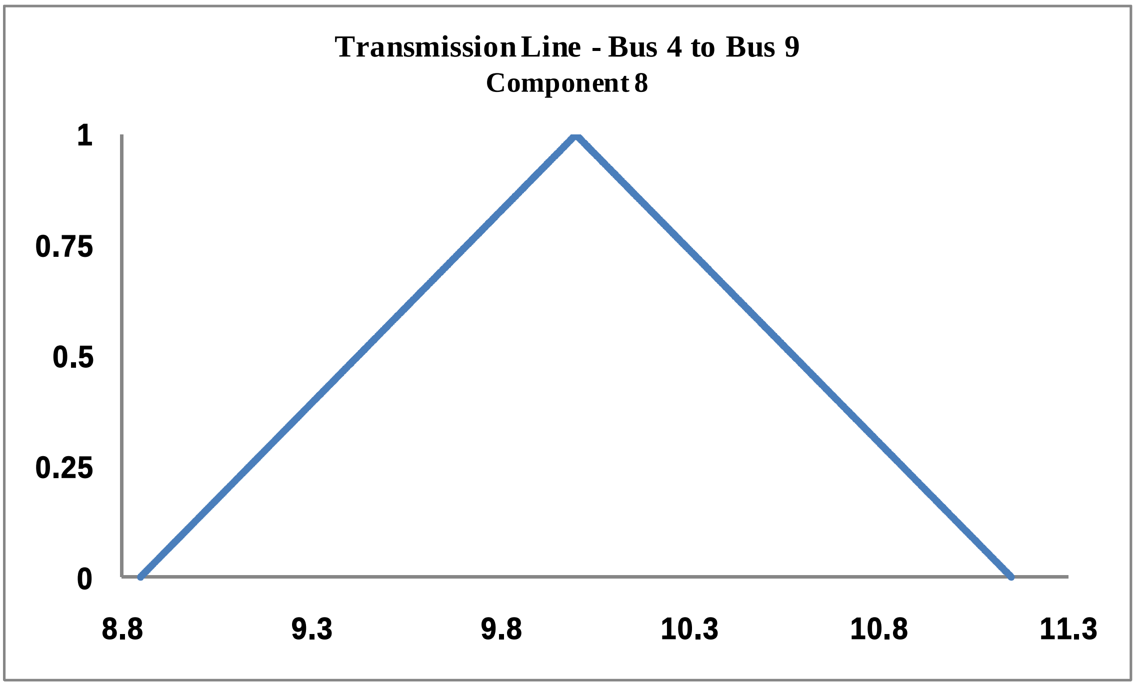

Transmission Line - Bus 1 to Bus 5
Component 3
1
0.75
0.5
0.25
0
7
8
9
10
11
12
13

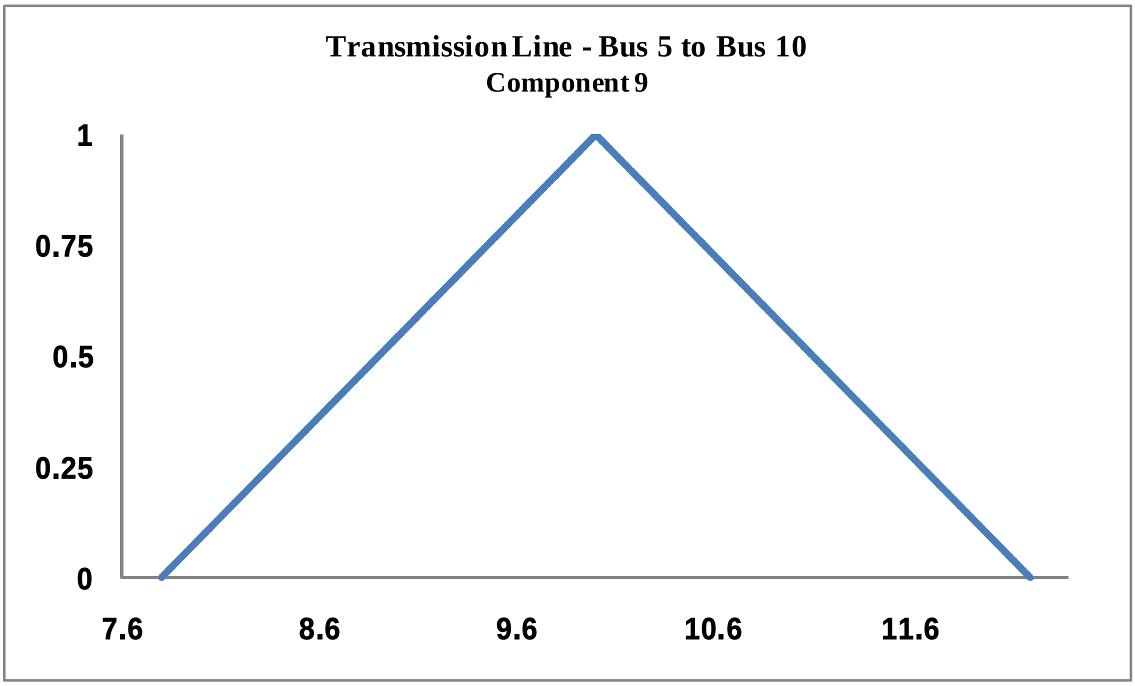

Transmission Line - Bus 2 to Bus 4
Component 4
1
0.75
0.5
0.25
0
8.4
8.9
9.4
9.9
10.4
10.9
11.4

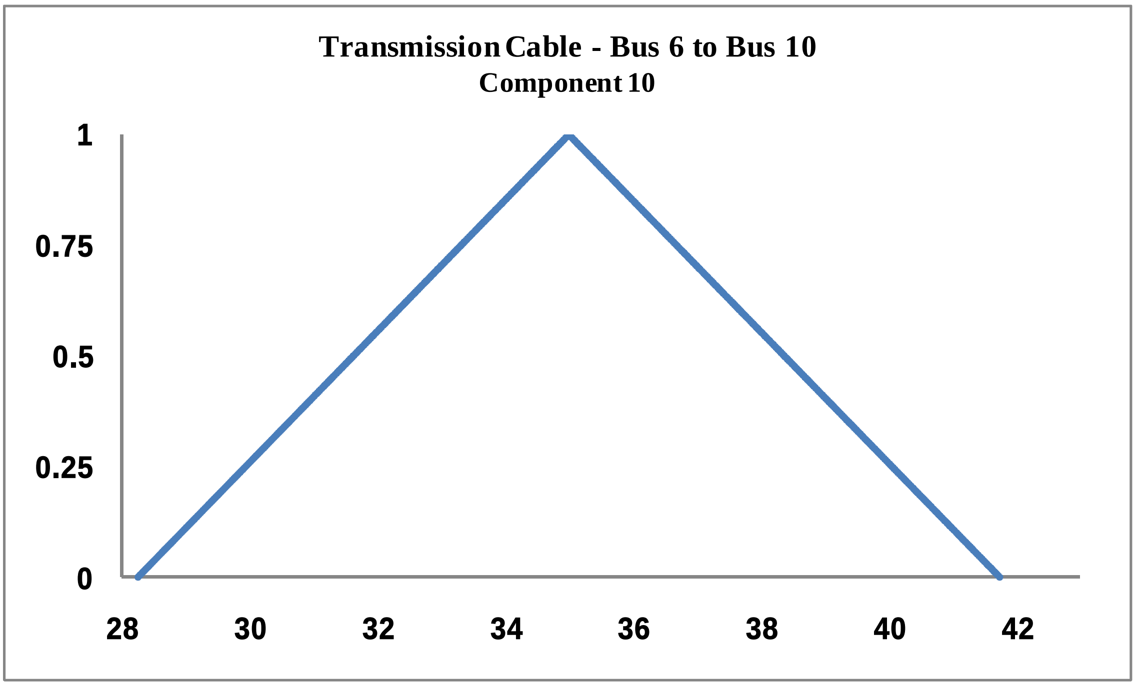

Transmission Line - Bus 2 to Bus 6
Component 5
1
0.75
0.5
0.25
0
8.9
9.4
9.9
10.4
10.9

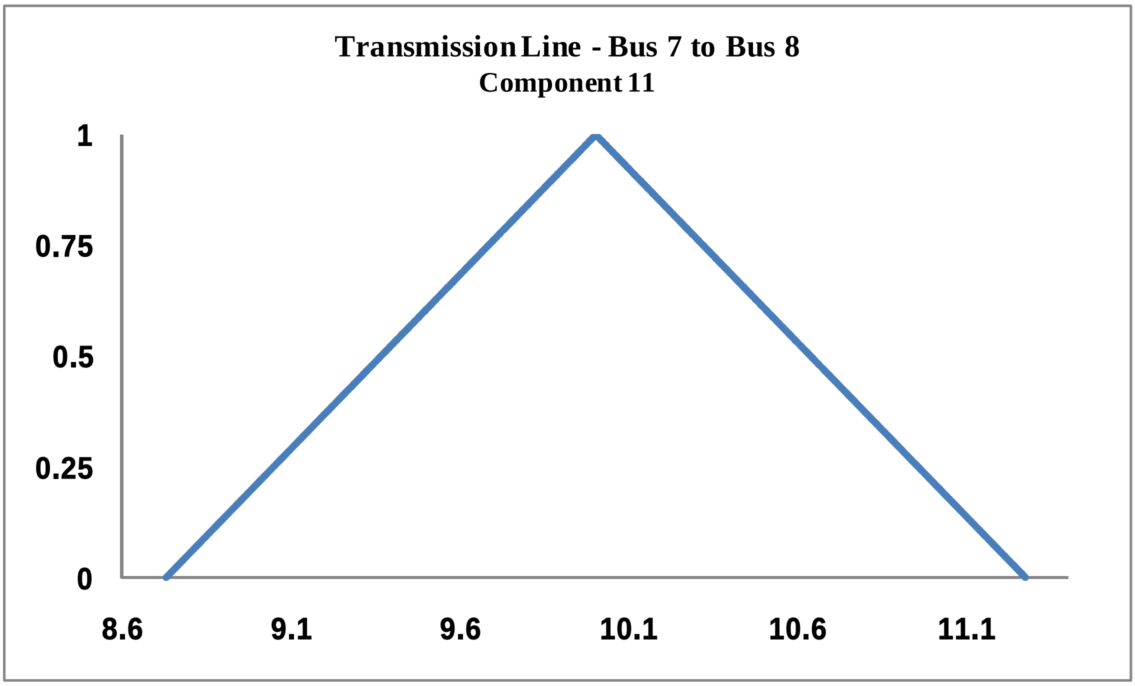

Transmission Line - Bus 3 to Bus 9
Component 6
1
0.75
0.5
0.25
0
8
8.5
9
9.5
10
10.5
11
11.5
12

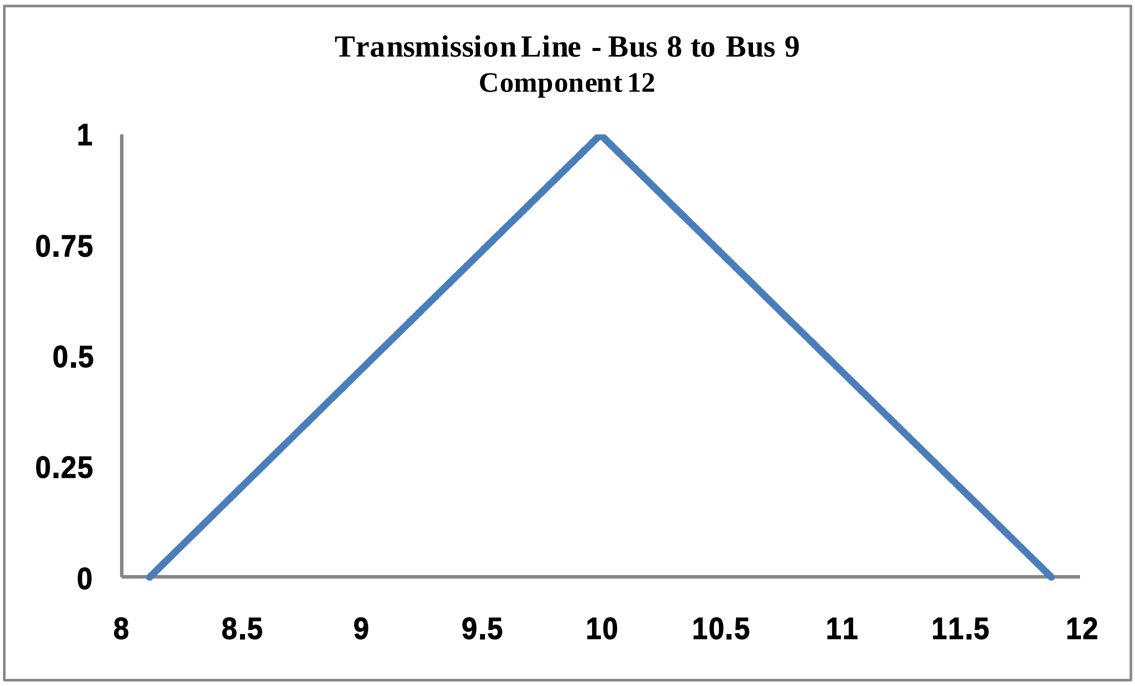

Transmission Transf. - Bus 3 to Bus 24
Component 7
1
0.75
0.5
0.25
0
753
758
763
768
773
778
783

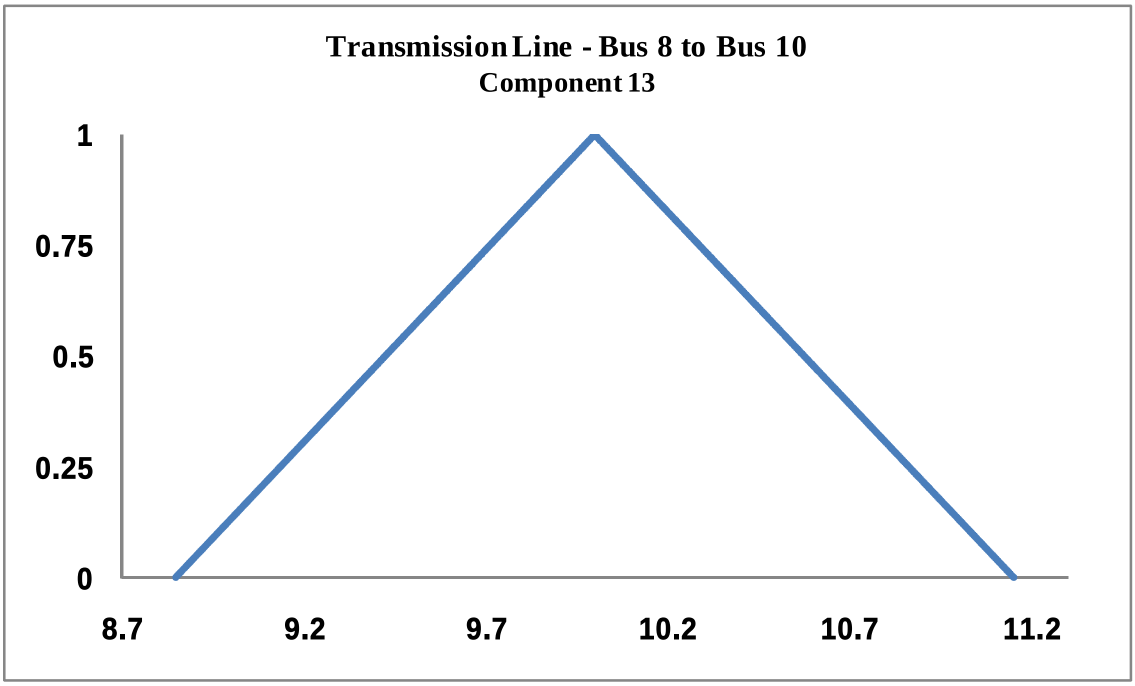

Transmission Line - Bus 4 to Bus 9
Component 8
1
0.75
0.5
0.25
0
8.8
9.3
9.8
10.3
10.8
11.3

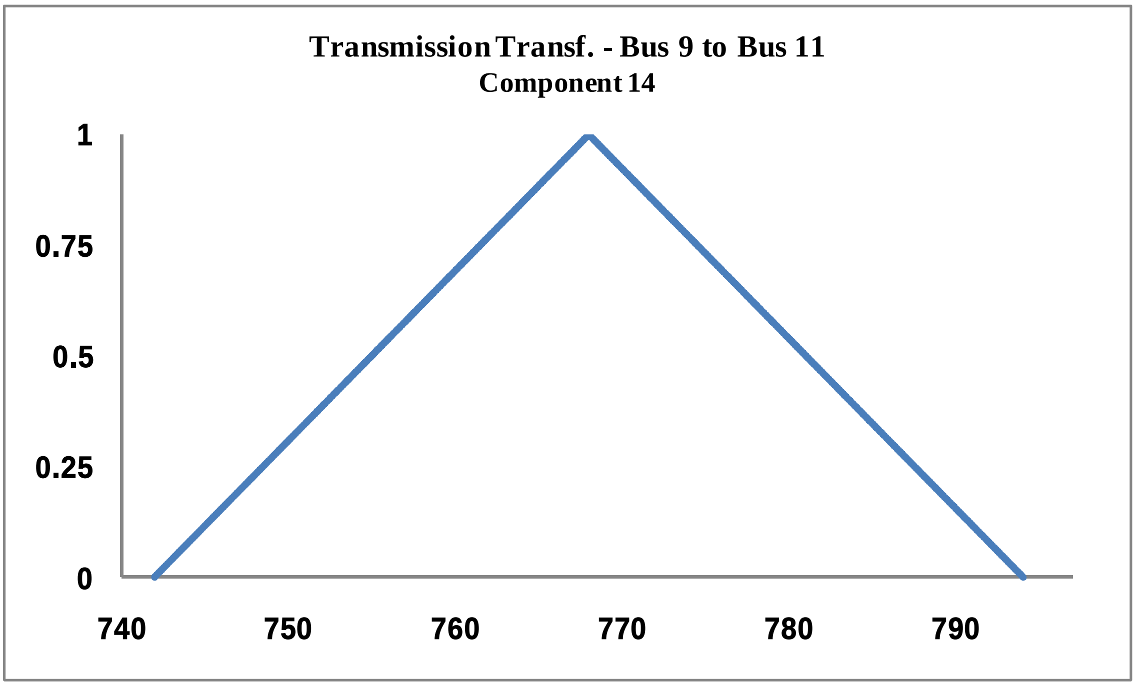

Transmission Line - Bus 5 to Bus 10
Component 9
1
0.75
0.5
0.25
0
7.6
8.6
9.6
10.6
11.6

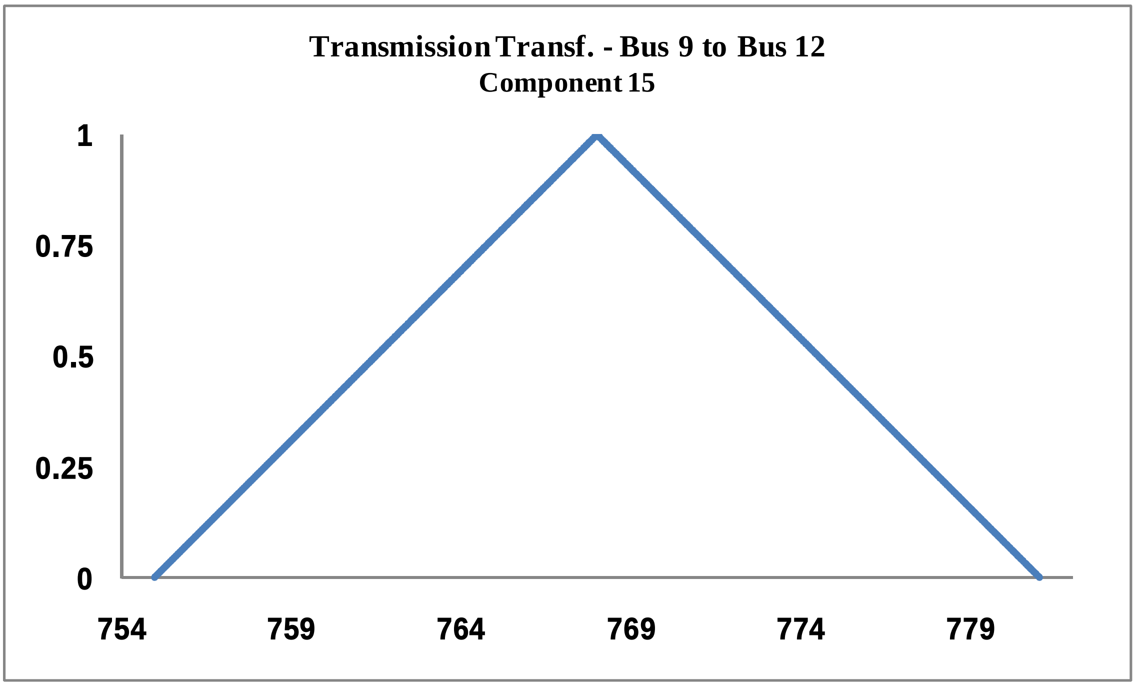

Transmission Cable - Bus 6 to Bus 10
Component 10
1
0.75
0.5
0.25
0
28
30
32
34
36
38
40
42

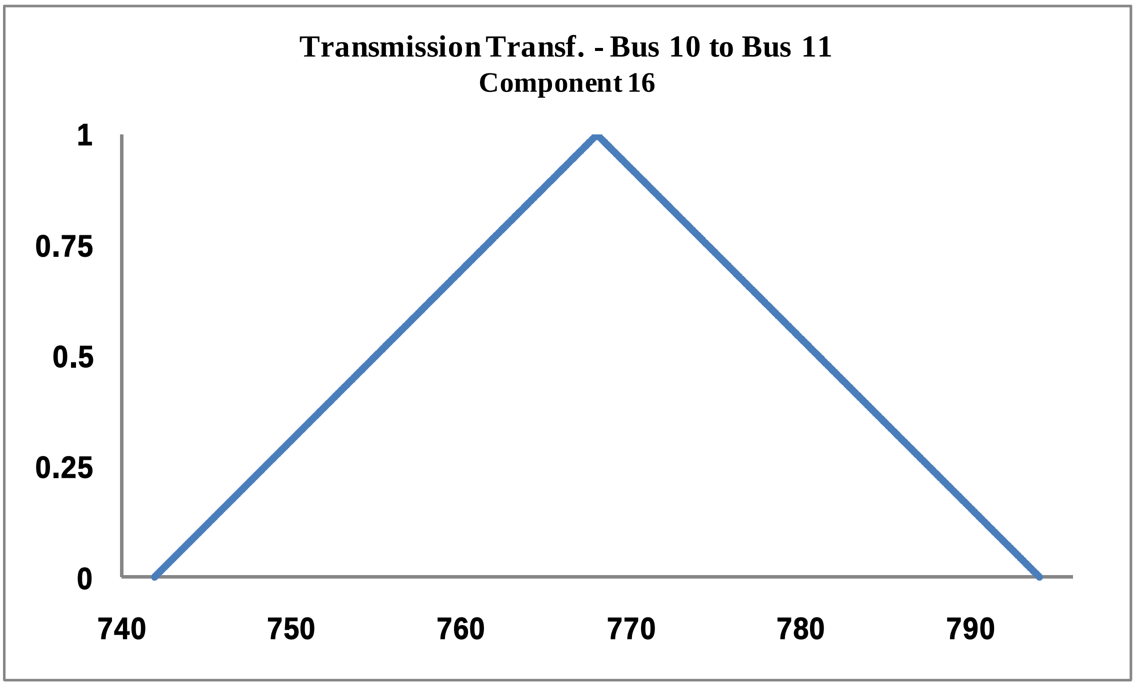

Transmission Line - Bus 7 to Bus 8
Component 11
1
0.75
0.5
0.25
0
8.6
9.1
9.6
10.1
10.6
11.1

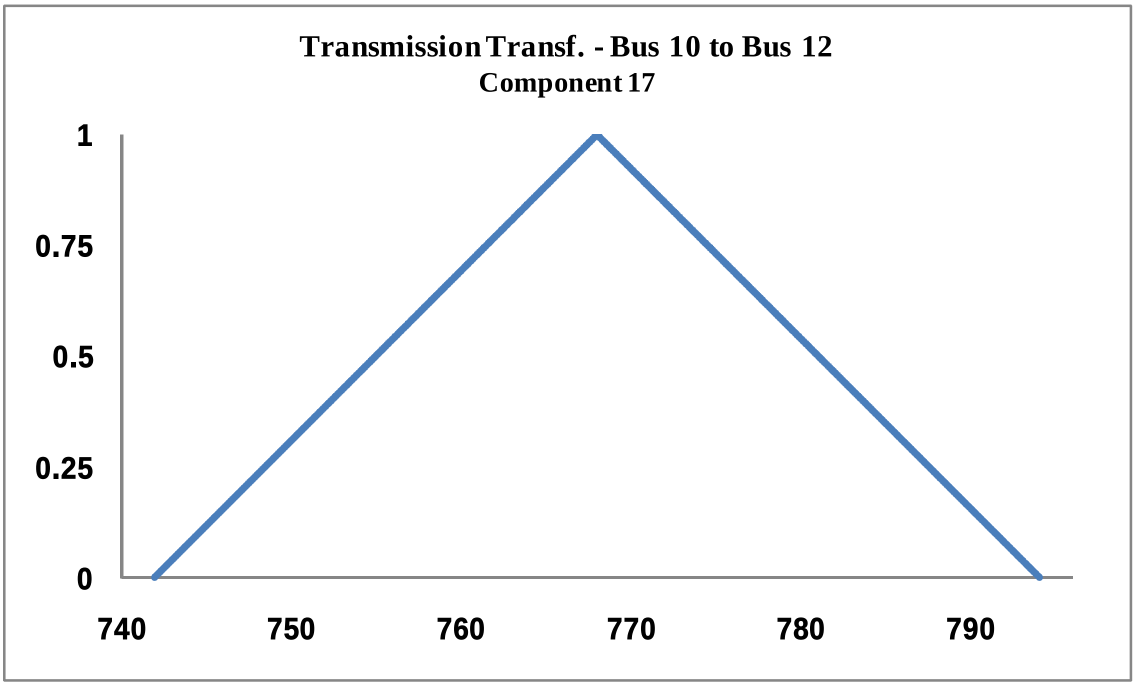

Transmission Line - Bus 8 to Bus 9
Component 12
1
0.75
0.5
0.25
0
8
8.5
9
9.5
10
10.5
11
11.5
12

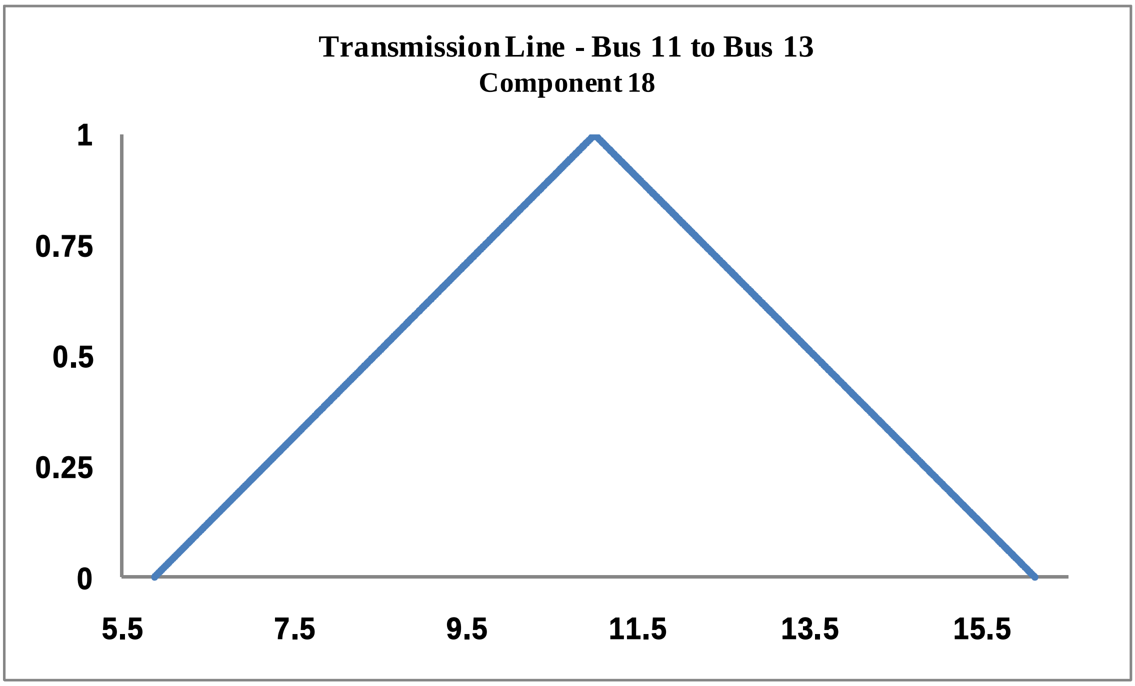

Transmission Line - Bus 8 to Bus 10
Component 13
1
0.75
0.5
0.25
0
8.7
9.2
9.7
10.2
10.7
11.2

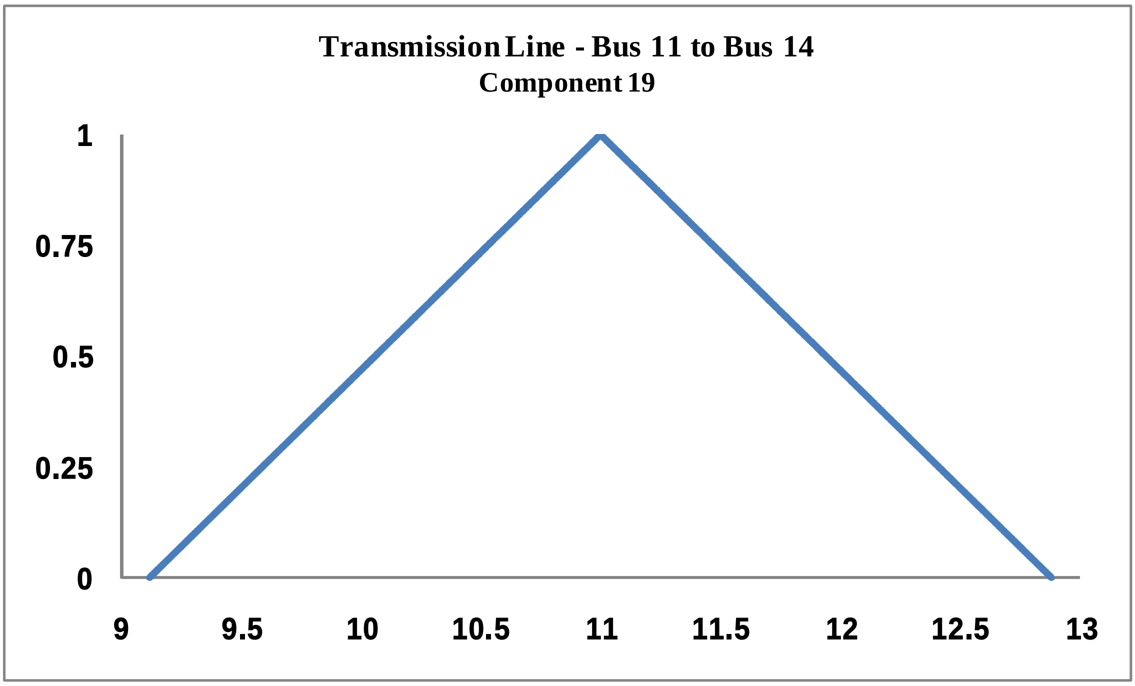

Transmission Transf. - Bus 9 to Bus 11
Component 14
1
0.75
0.5
0.25
0
740
750
760
770
780
790

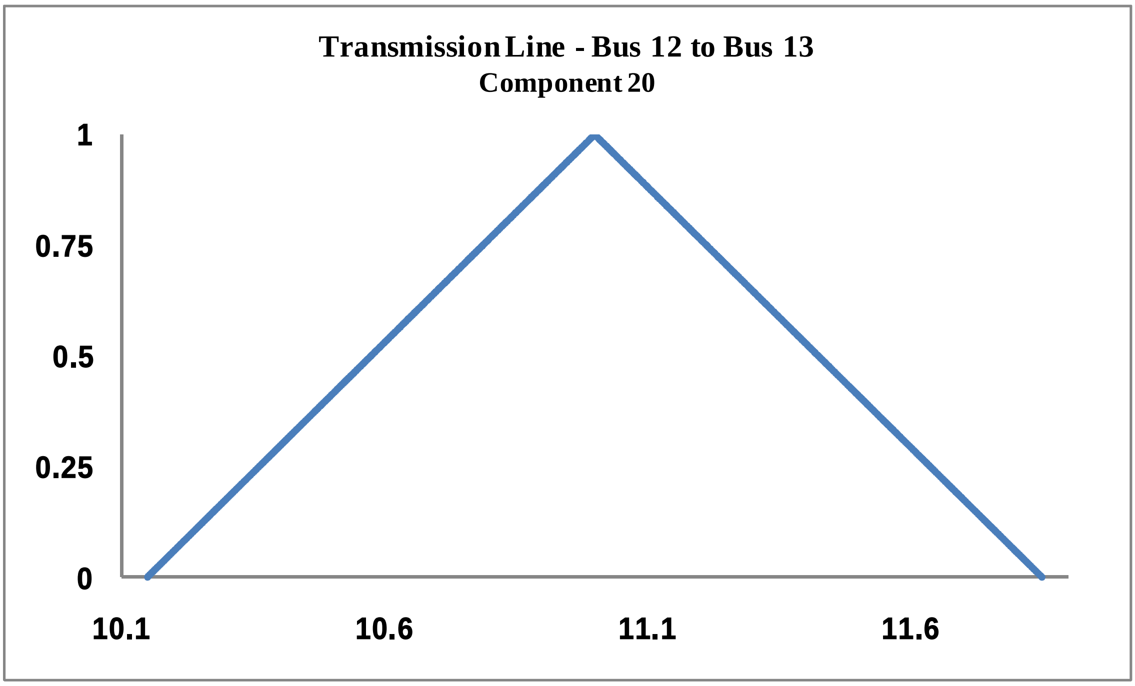

Transmission Transf. - Bus 9 to Bus 12
Component 15
1
0.75
0.5
0.25
0
754
759
764
769
774
779

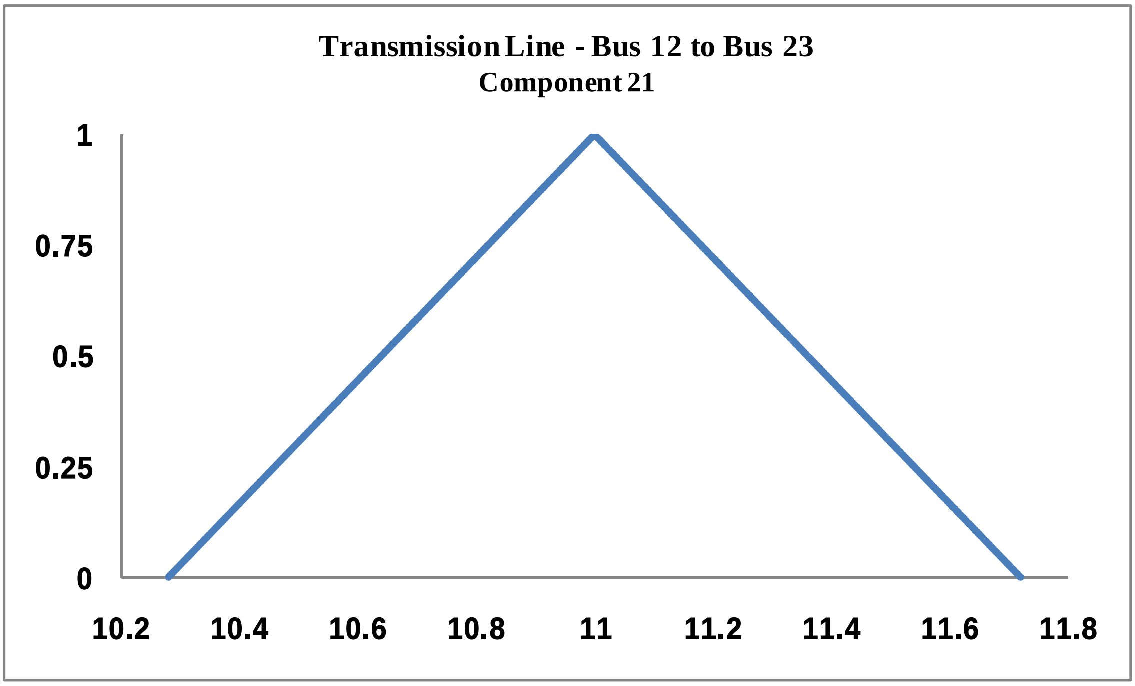

Transmission Transf. - Bus 10 to Bus 11
Component 16
1
0.75
0.5
0.25
0
740
750
760
770
780
790

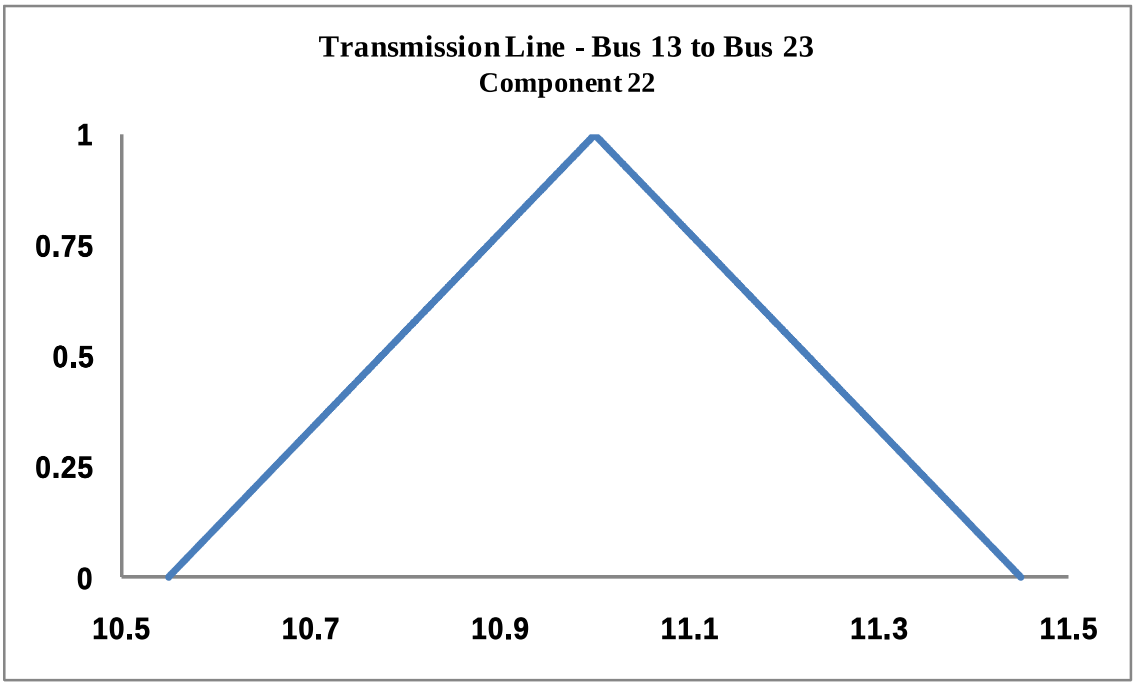

Transmission Transf. - Bus 10 to Bus 12
Component 17
1
0.75
0.5
0.25
0
740
750
760
770
780
790

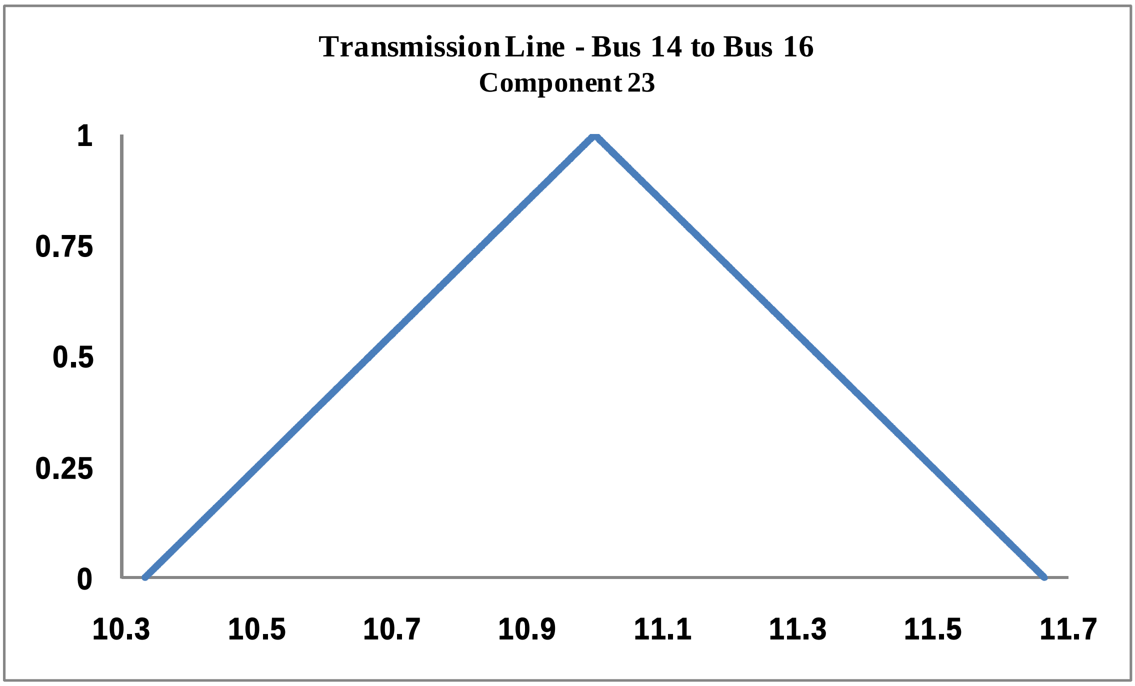

Transmission Line - Bus 11 to Bus 13
Component 18
1
0.75
0.5
0.25
0
5.5
7.5
9.5
11.5
13.5
15.5

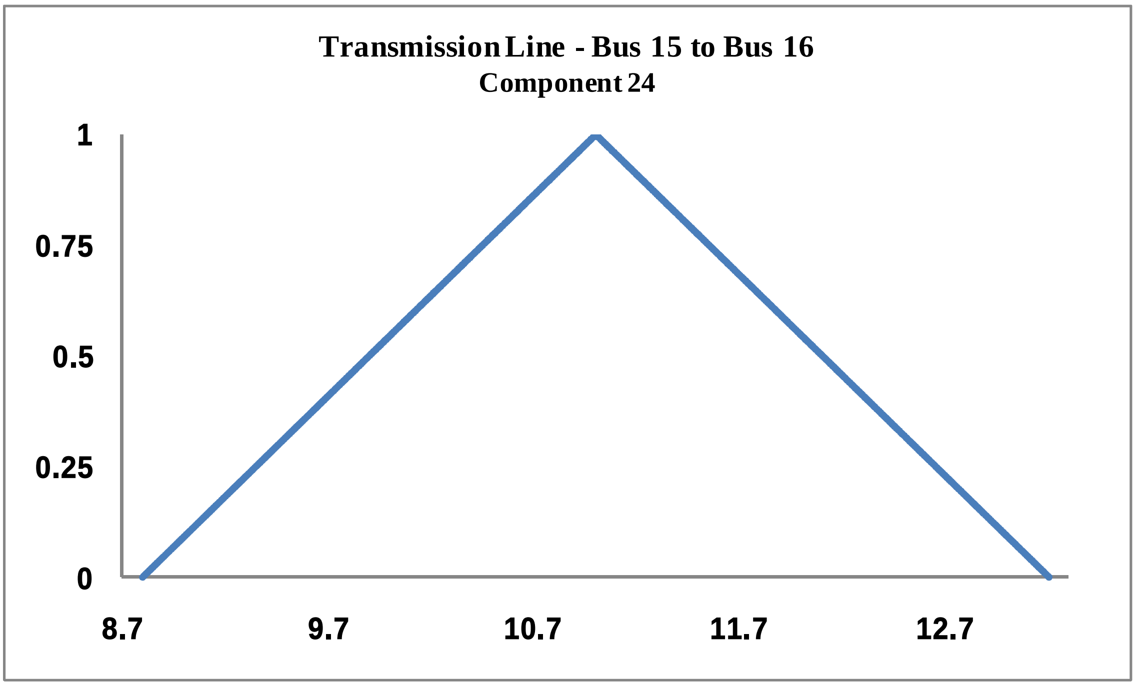

Transmission Line - Bus 11 to Bus 14
Component 19
1
0.75
0.5
0.25
0
9
9.5
10
10.5
11
11.5
12
12.5
13

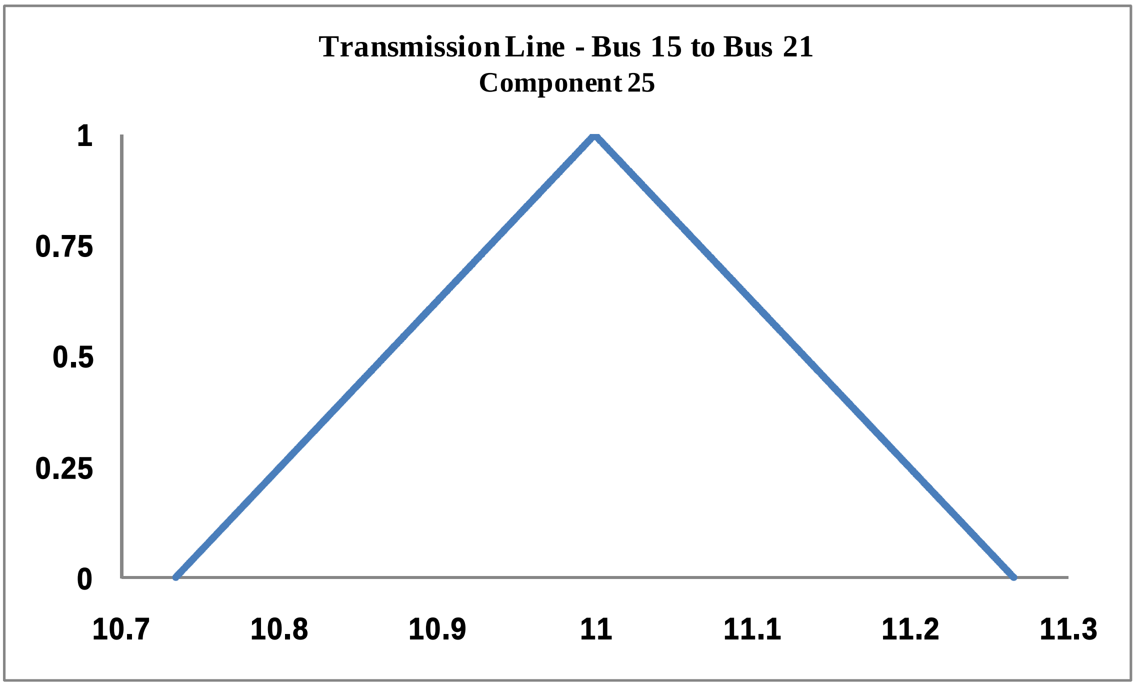

Transmission Line - Bus 12 to Bus 13
Component 20
1
0.75
0.5
0.25
0
10.1
10.6
11.1
11.6

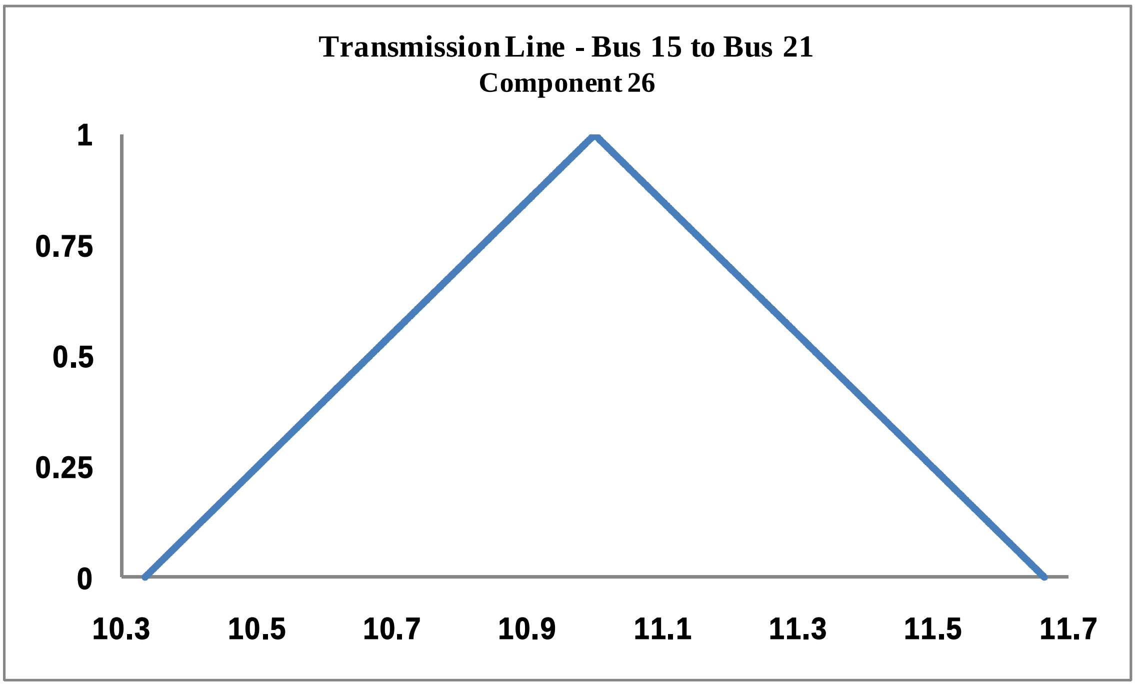

Transmission Line - Bus 12 to Bus 23
Component 21
1
0.75
0.5
0.25
0
10.2
10.4
10.6
10.8
11
11.2
11.4
11.6
11.8

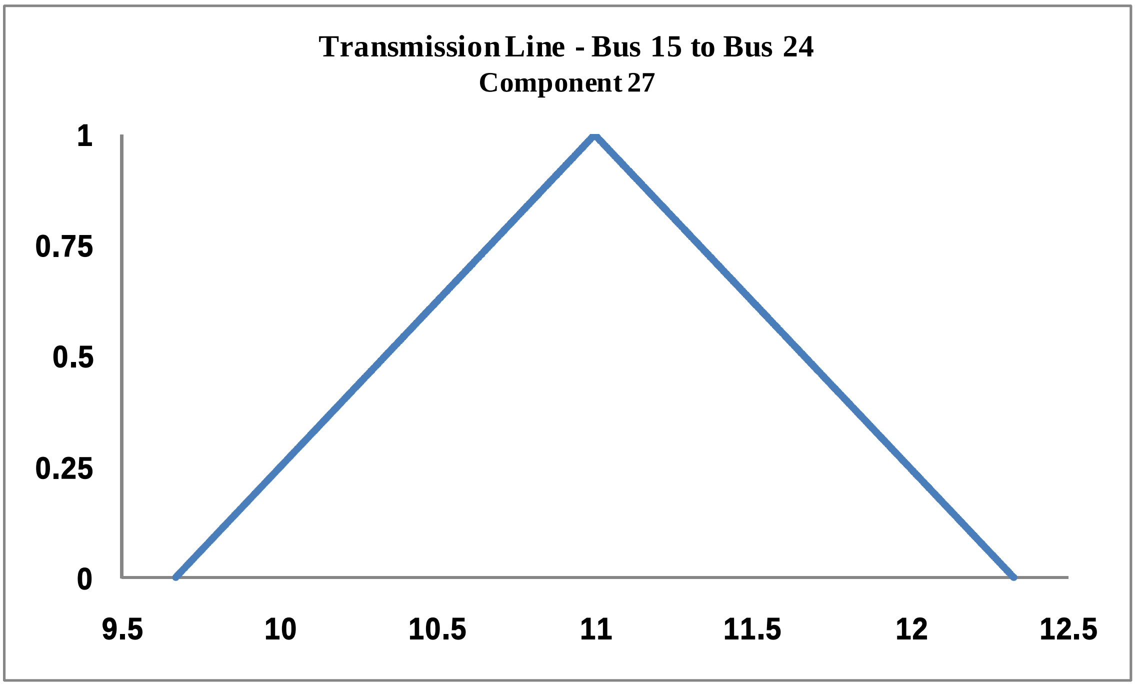

Transmission Line - Bus 13 to Bus 23
Component 22
1
0.75
0.5
0.25
0
10.5
10.7
10.9
11.1
11.3
11.5

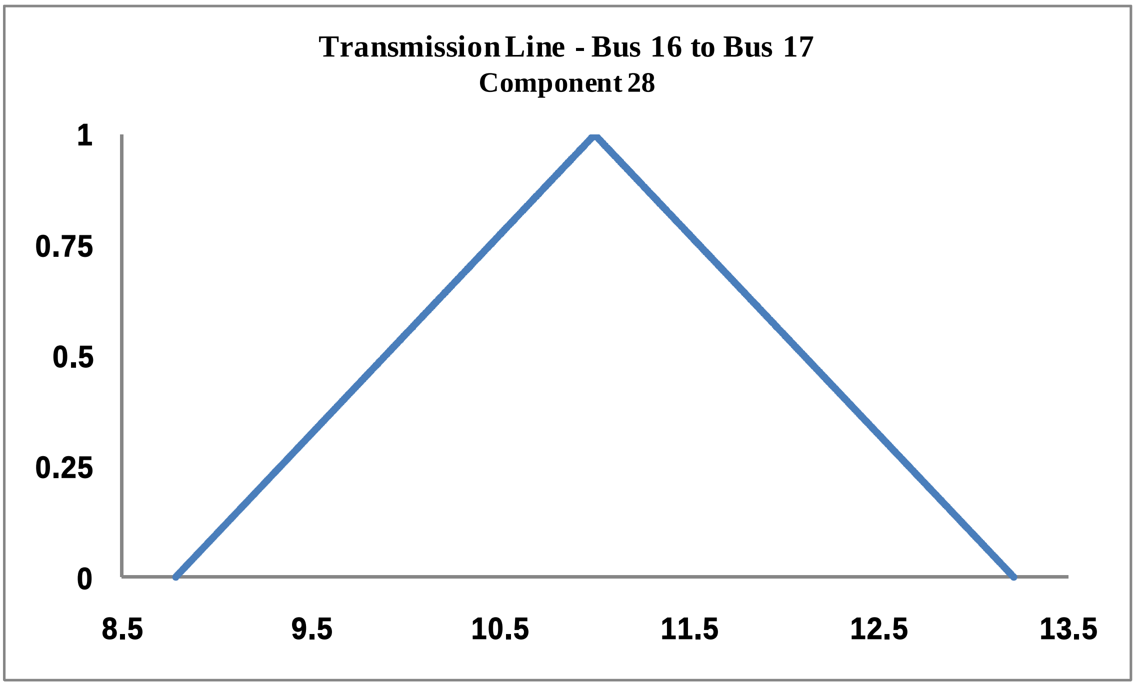

Transmission Line - Bus 14 to Bus 16
Component 23
1
0.75
0.5
0.25
0
10.3
10.5
10.7
10.9
11.1
11.3
11.5
11.7

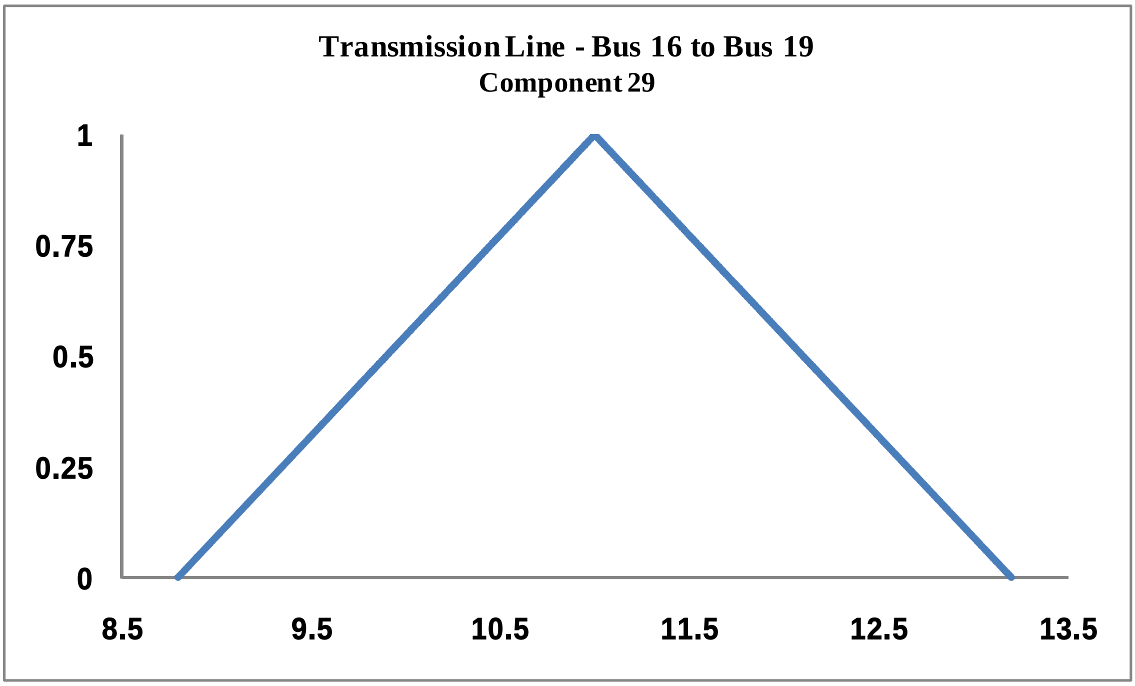

Transmission Line - Bus 15 to Bus 16
Component 24
1
0.75
0.5
0.25
0
8.7
9.7
10.7
11.7
12.7

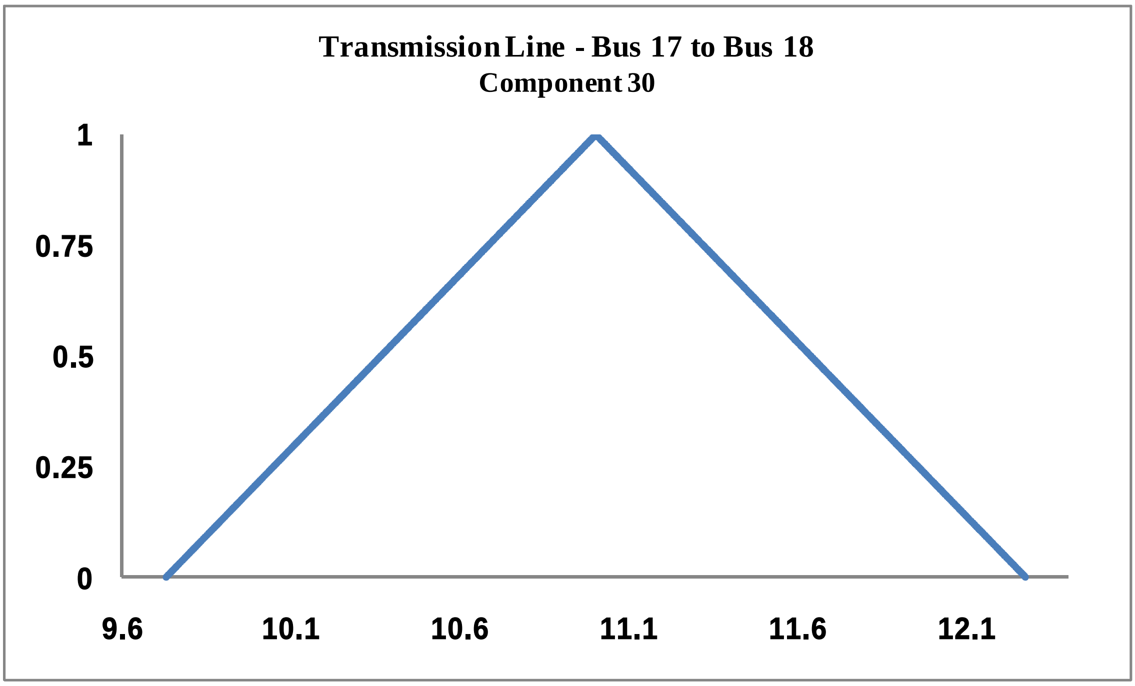

Transmission Line - Bus 15 to Bus 21
Component 25
1
0.75
0.5
0.25
0
10.7
10.8
10.9
11
11.1
11.2
11.3

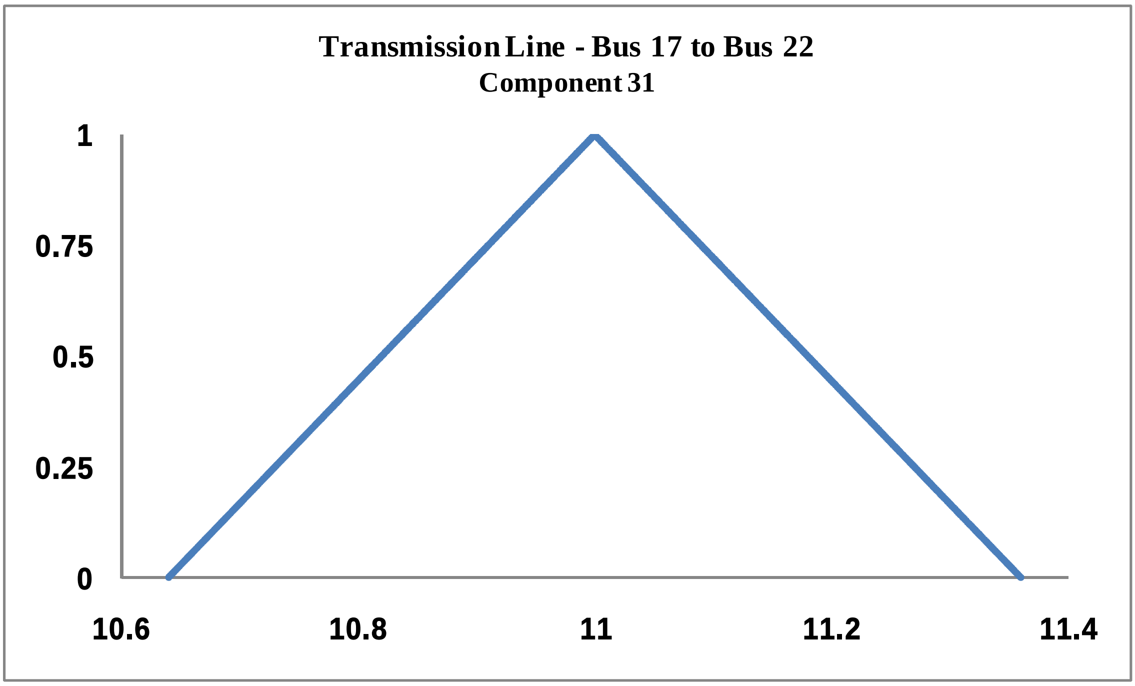

Transmission Line - Bus 15 to Bus 21
Component 26
1
0.75
0.5
0.25
0
10.3
10.5
10.7
10.9
11.1
11.3
11.5
11.7

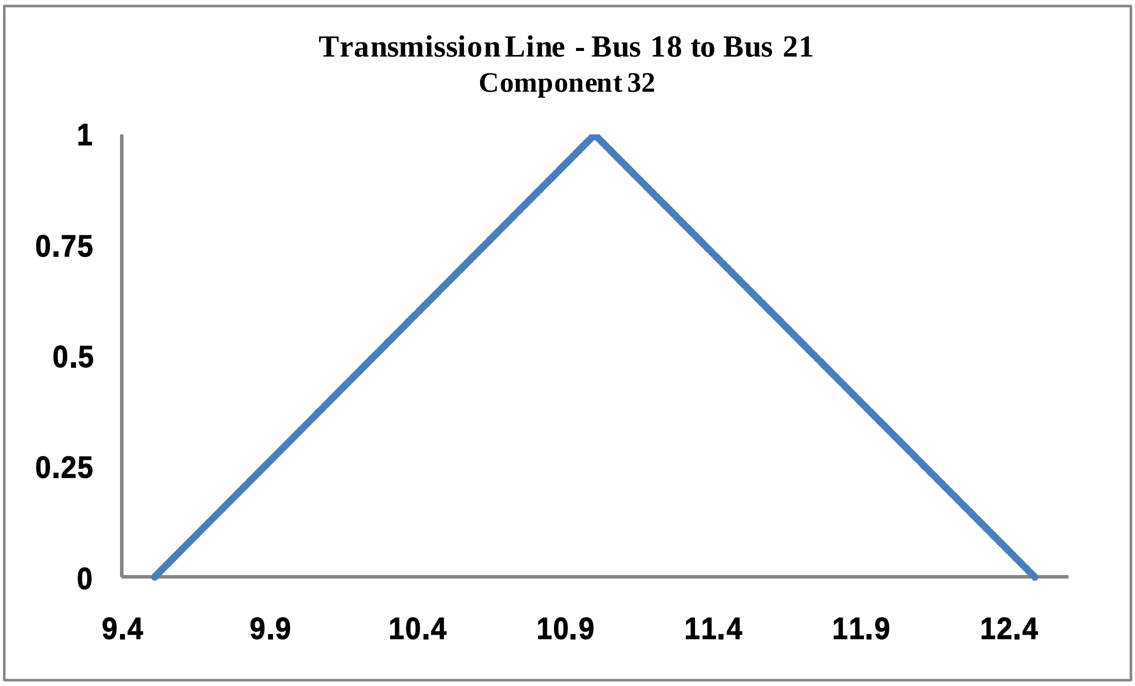

Transmission Line - Bus 15 to Bus 24
Component 27
1
0.75
0.5
0.25
0
9.5
10
10.5
11
11.5
12
12.5

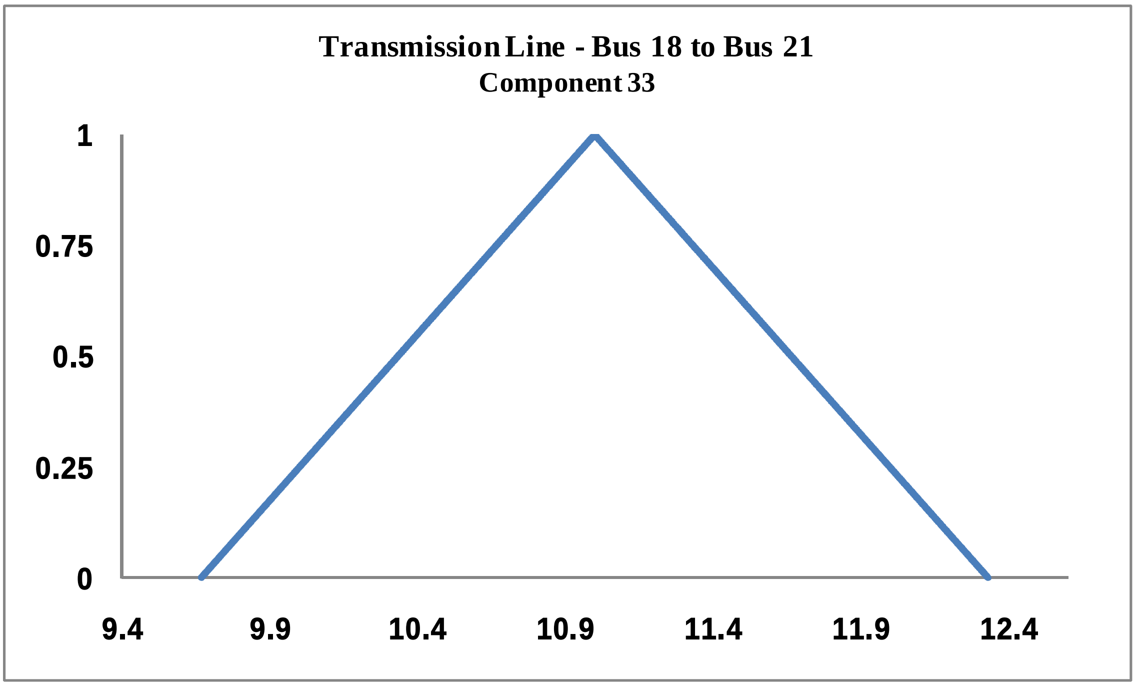

Transmission Line - Bus 16 to Bus 17
Component 28
1
0.75
0.5
0.25
0
8.5
9.5
10.5
11.5
12.5
13.5

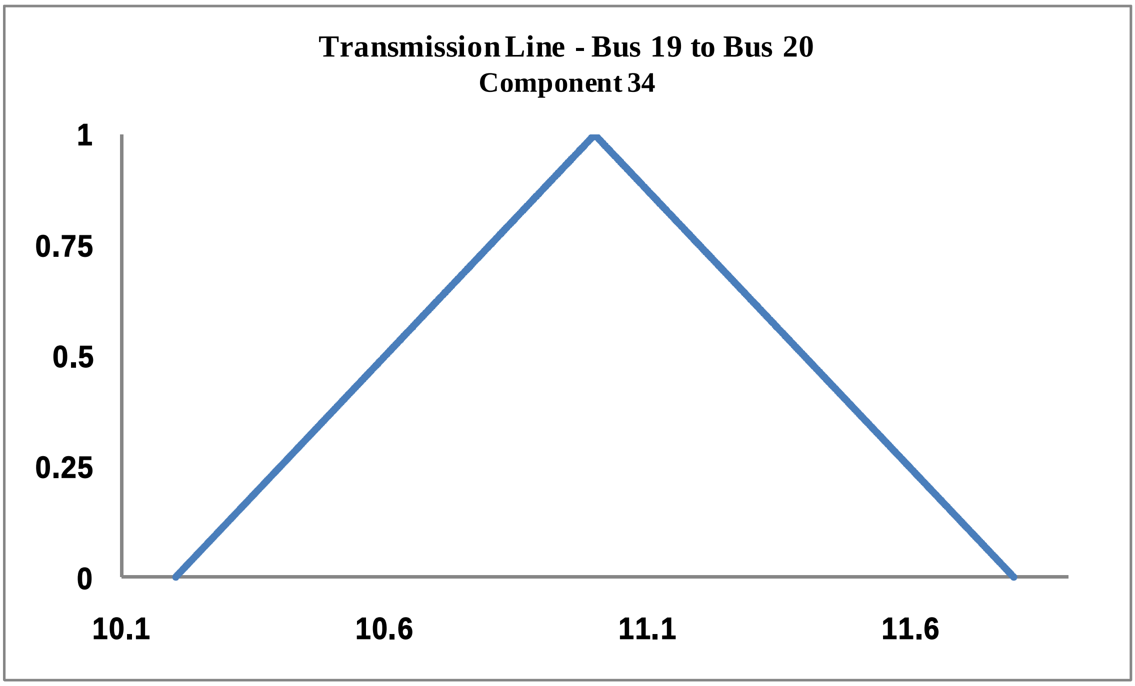

Transmission Line - Bus 16 to Bus 19
Component 29
1
0.75
0.5
0.25
0
8.5
9.5
10.5
11.5
12.5
13.5

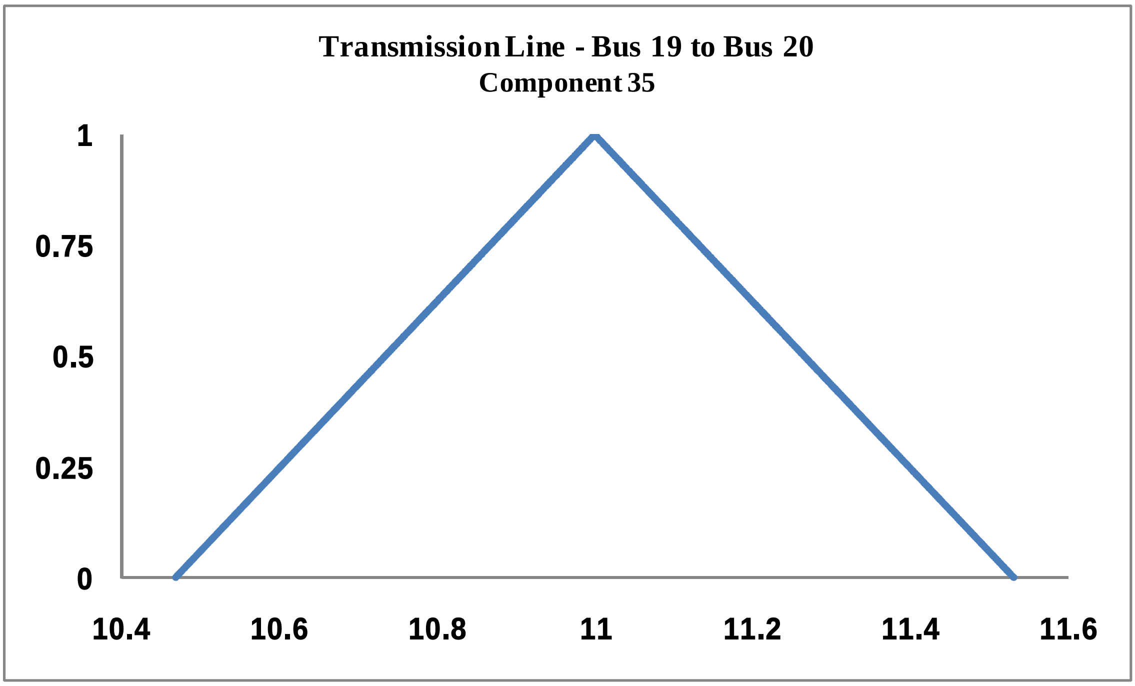

Transmission Line - Bus 17 to Bus 18
Component 30
1
0.75
0.5
0.25
0
9.6
10.1
10.6
11.1
11.6
12.1

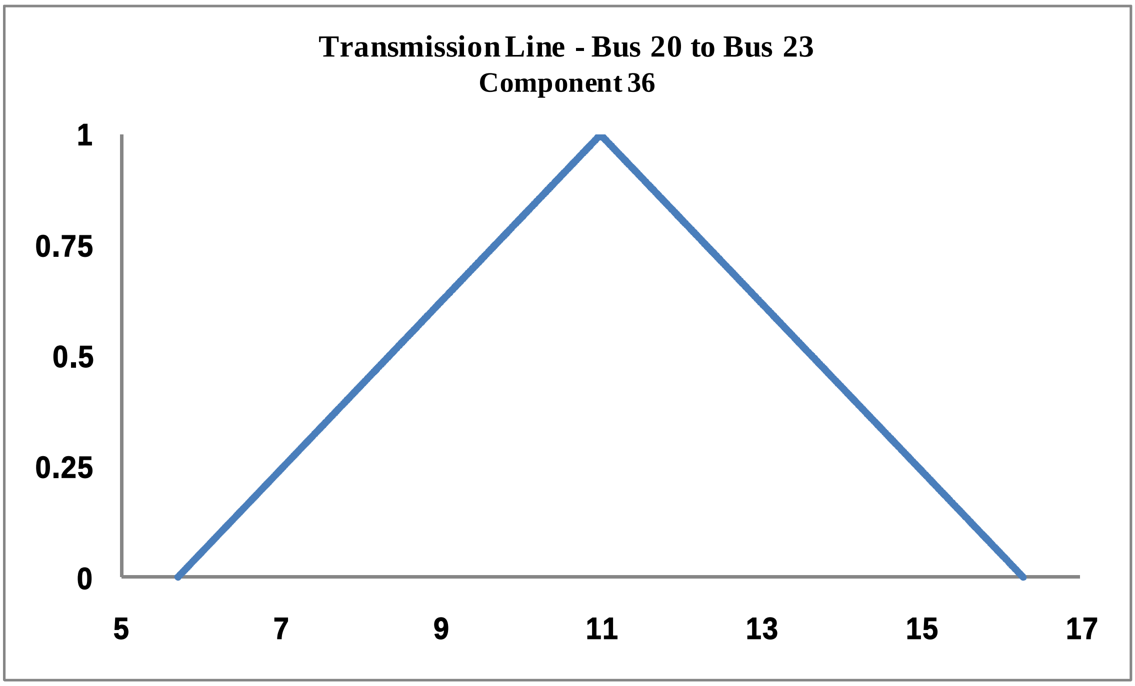

Transmission Line - Bus 17 to Bus 22
Component 31
1
0.75
0.5
0.25
0
10.6
10.8
11
11.2
11.4

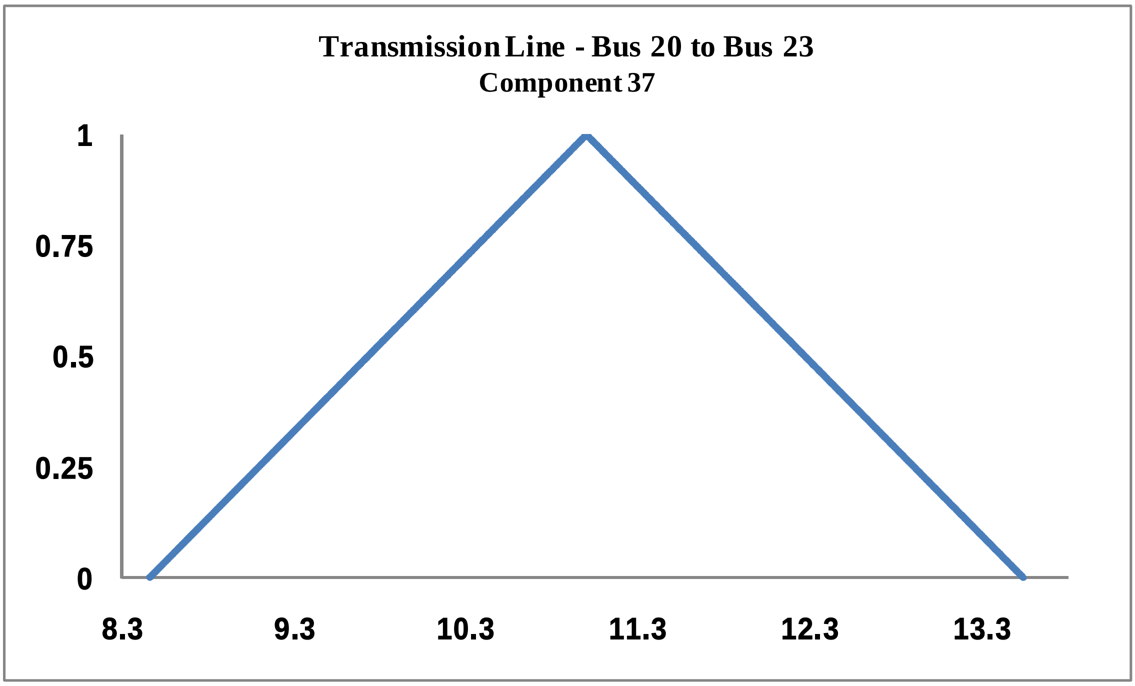

Transmission Line - Bus 18 to Bus 21
Component 32
1
0.75
0.5
0.25
0
9.4
9.9
10.4
10.9
11.4
11.9
12.4

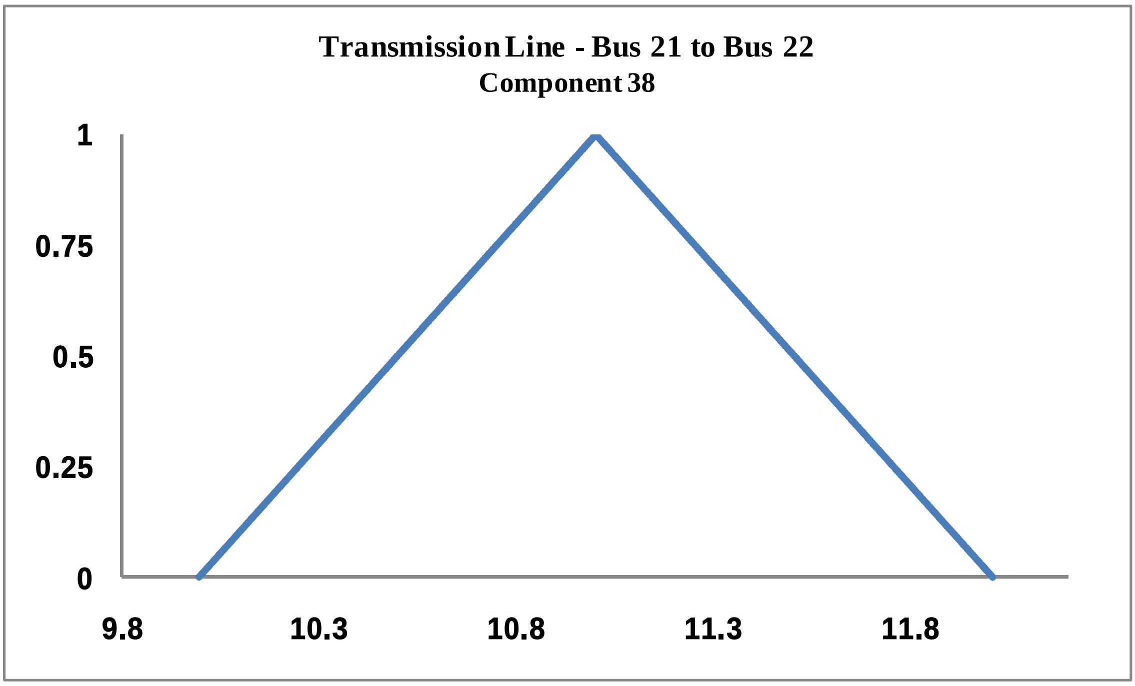

Transmission Line - Bus 18 to Bus 21
Component 33
1
0.75
0.5
0.25
0
9.4
9.9
10.4
10.9
11.4
11.9
12.4

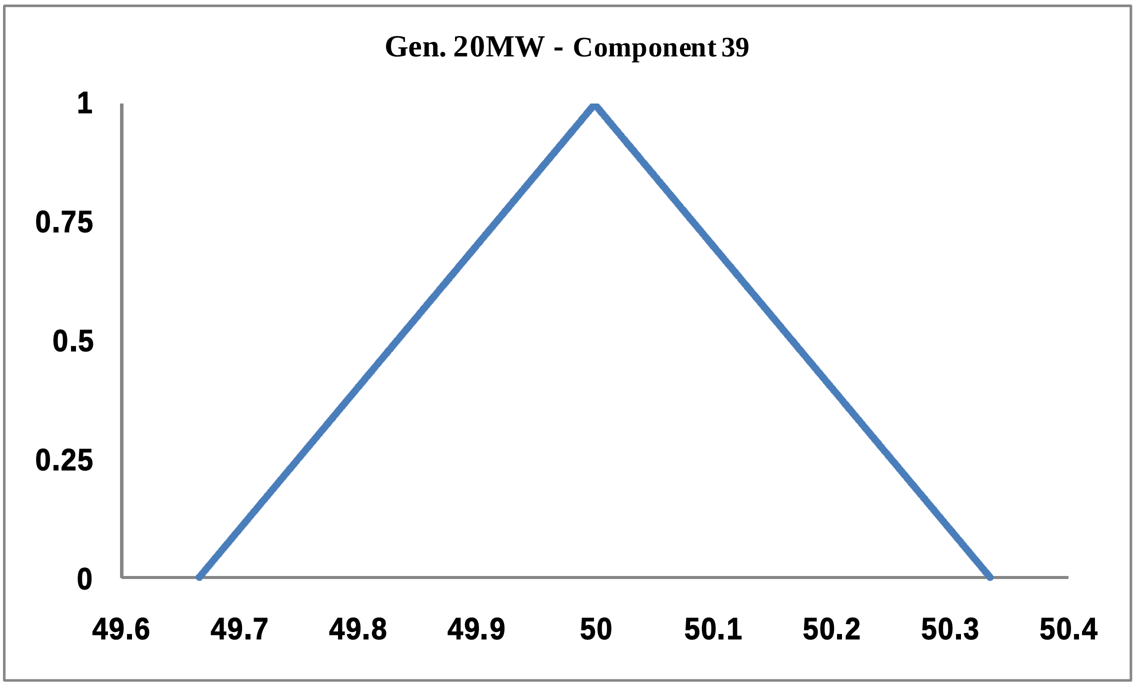

Transmission Line - Bus 19 to Bus 20
Component 34
1
0.75
0.5
0.25
0
10.1
10.6
11.1
11.6

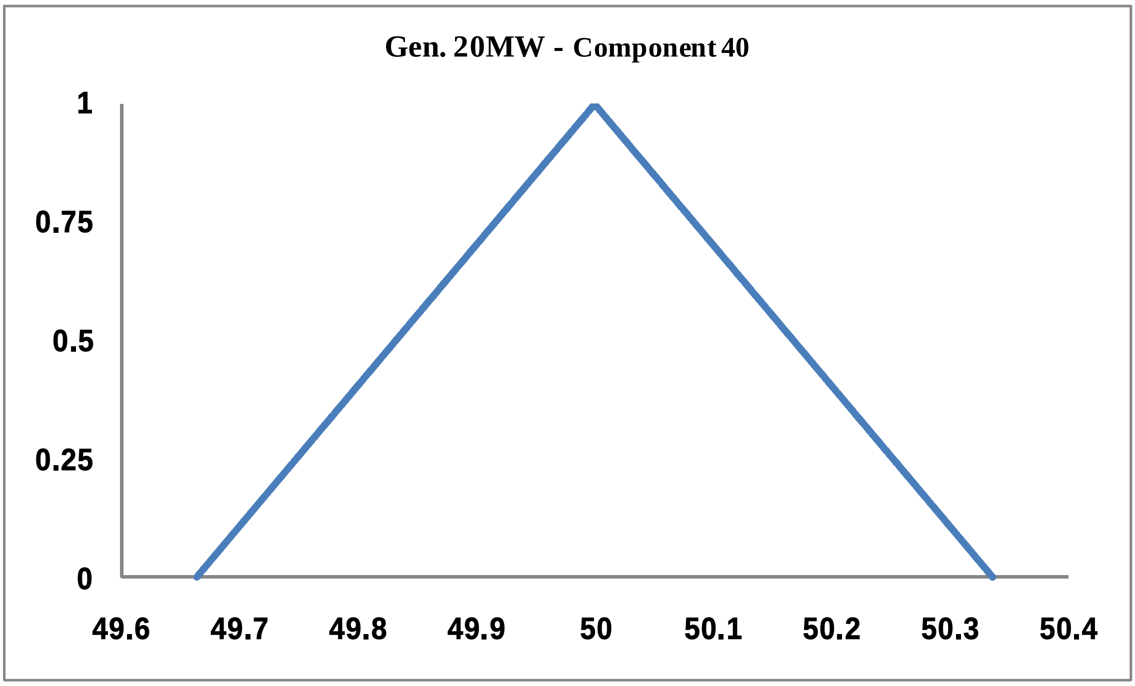

Transmission Line - Bus 19 to Bus 20
Component 35
1
0.75
0.5
0.25
0
10.4
10.6
10.8
11
11.2
11.4
11.6

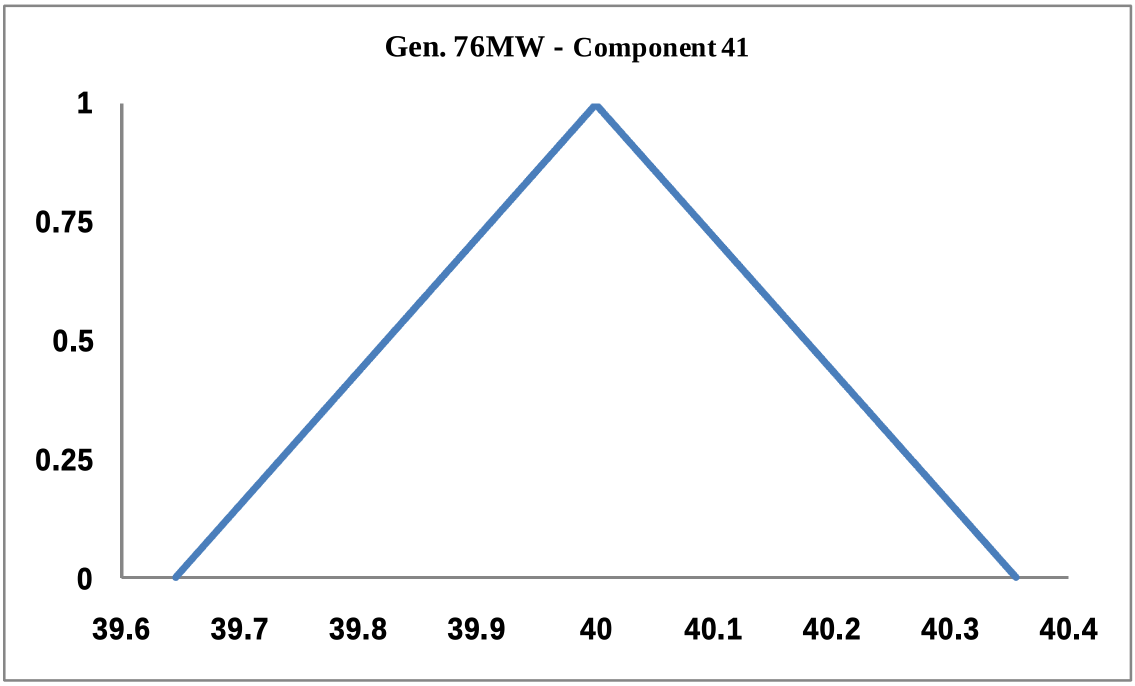

Transmission Line - Bus 20 to Bus 23
Component 36
1
0.75
0.5
0.25
0
5
7
9
11
13
15
17

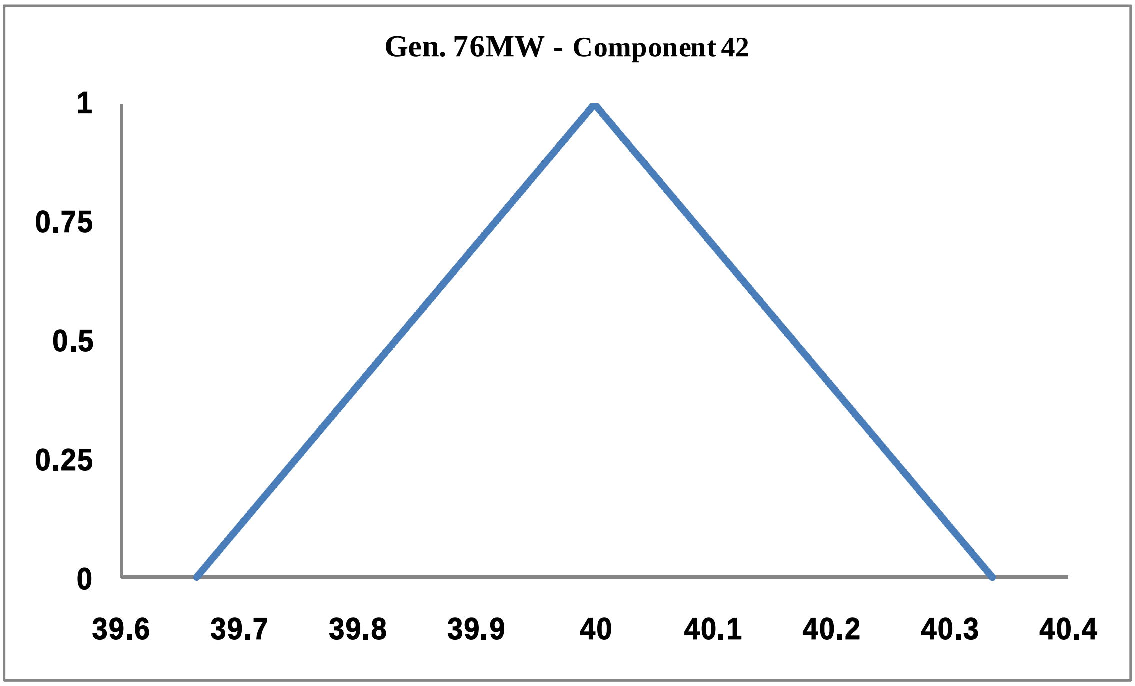

Transmission Line - Bus 20 to Bus 23
Component 37
1
0.75
0.5
0.25
0
8.3
9.3
10.3
11.3
12.3
13.3

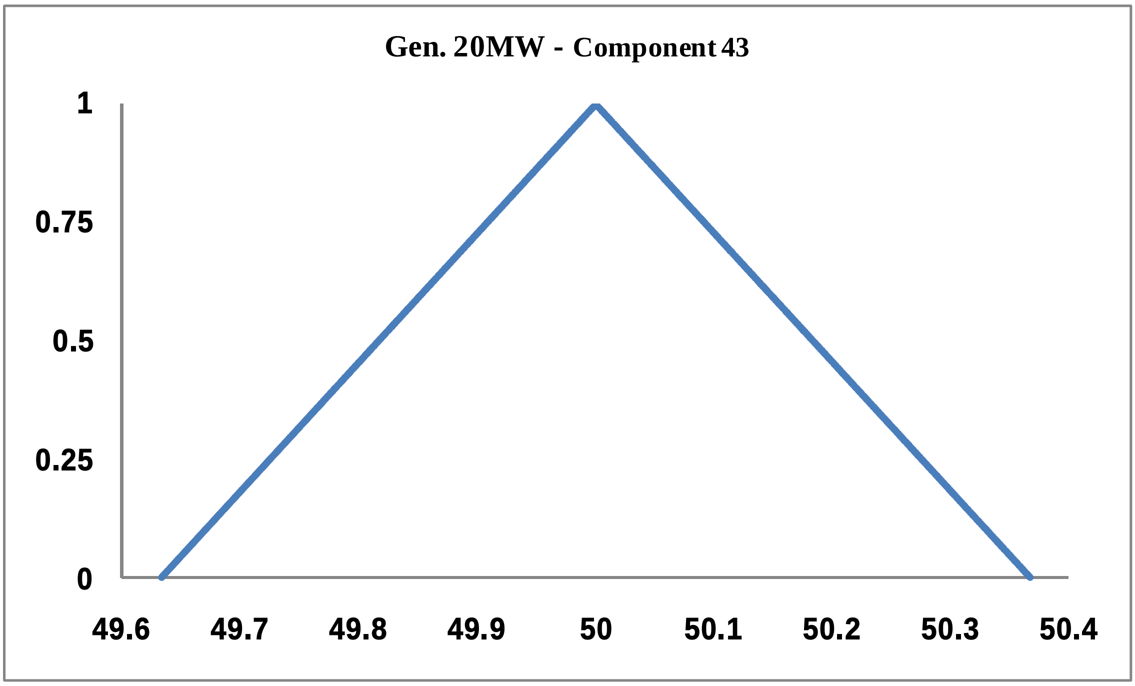

Transmission Line - Bus 21 to Bus 22
Component 38
1
0.75
0.5
0.25
0
9.8
10.3
10.8
11.3
11.8

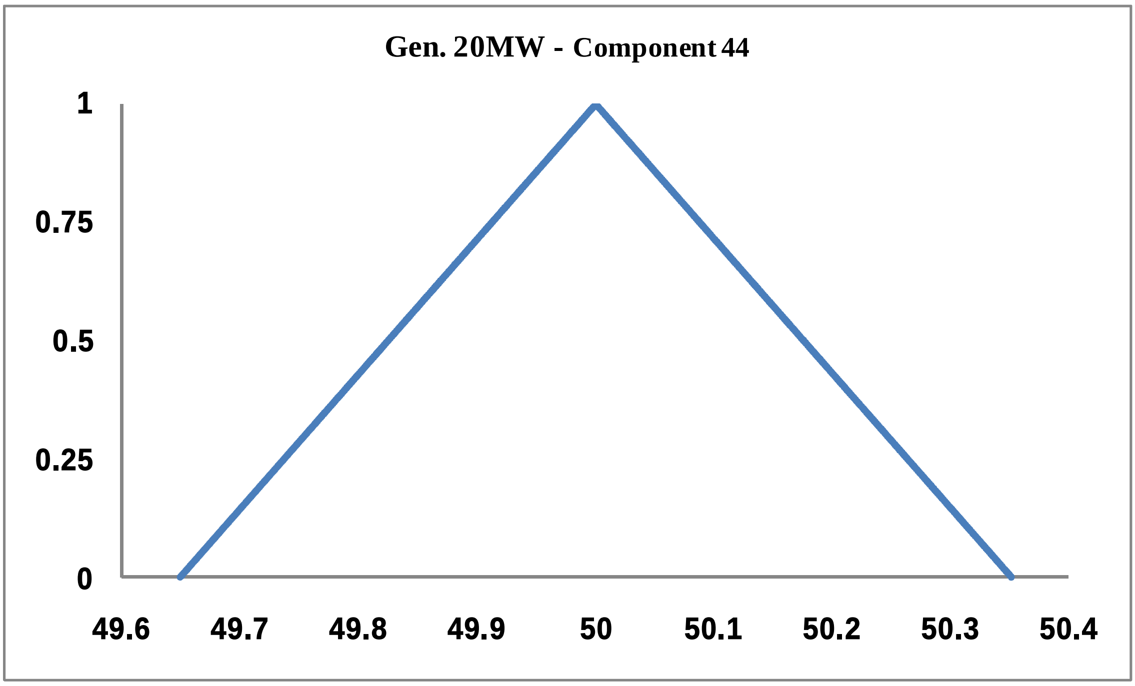

Gen. 20MW - Component 39
1
0.75
0.5
0.25
0
49.6
49.7
49.8
49.9
50
50.1
50.2
50.3
50.4

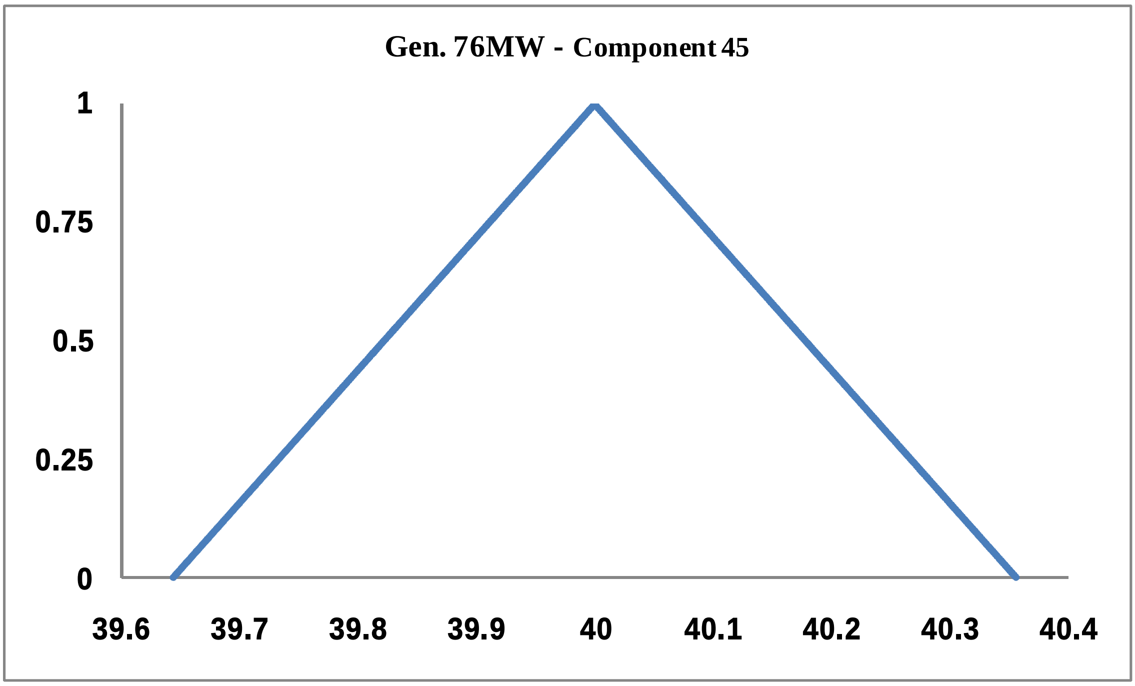

Gen. 20MW - Component 40
1
0.75
0.5
0.25
0
49.6
49.7
49.8
49.9
50
50.1
50.2
50.3
50.4

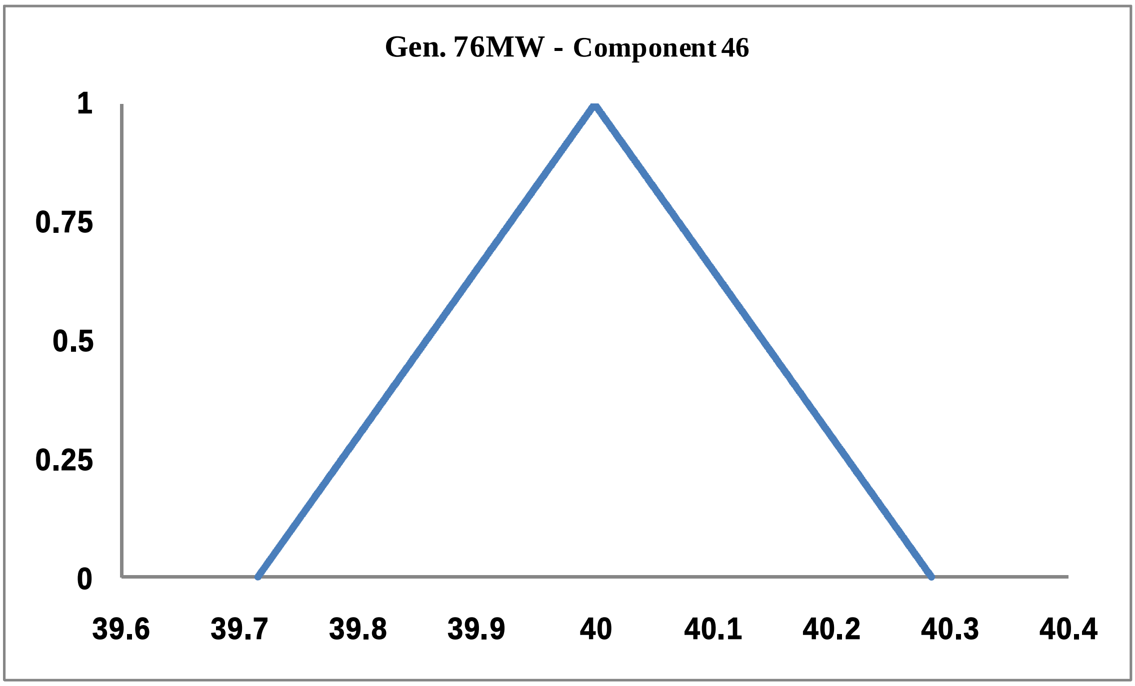

Gen. 76MW - Component 41
1
0.75
0.5
0.25
0
39.6
39.7
39.8
39.9
40
40.1
40.2
40.3
40.4

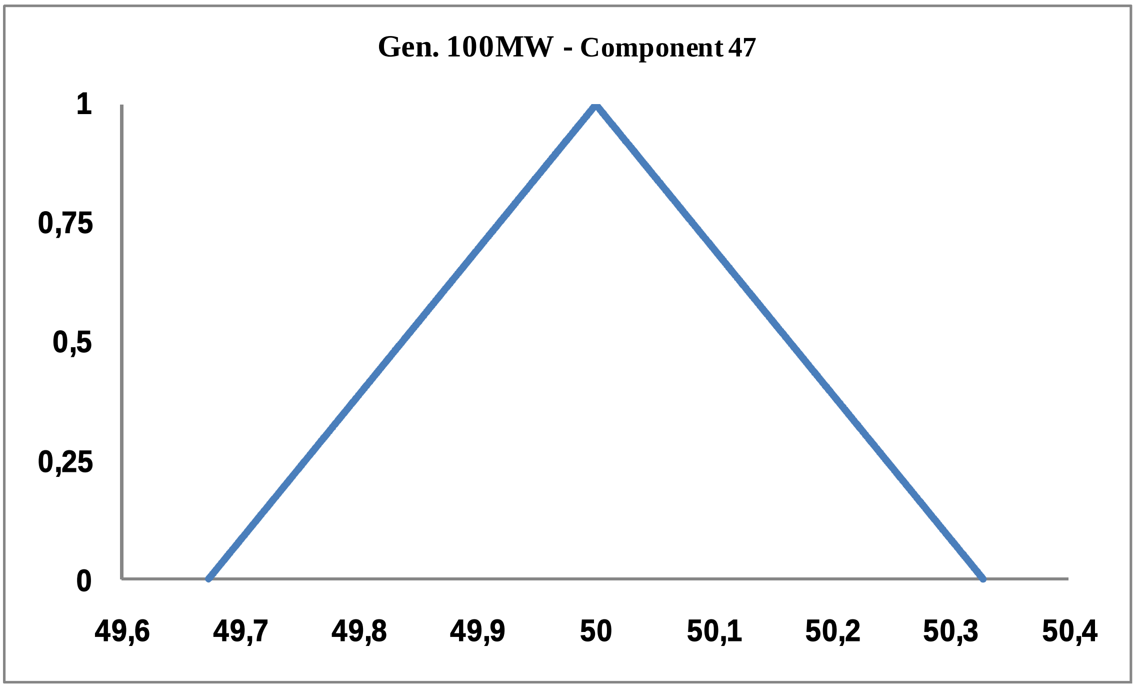

Gen. 76MW - Component 42
1
0.75
0.5
0.25
0
39.6
39.7
39.8
39.9
40
40.1
40.2
40.3
40.4

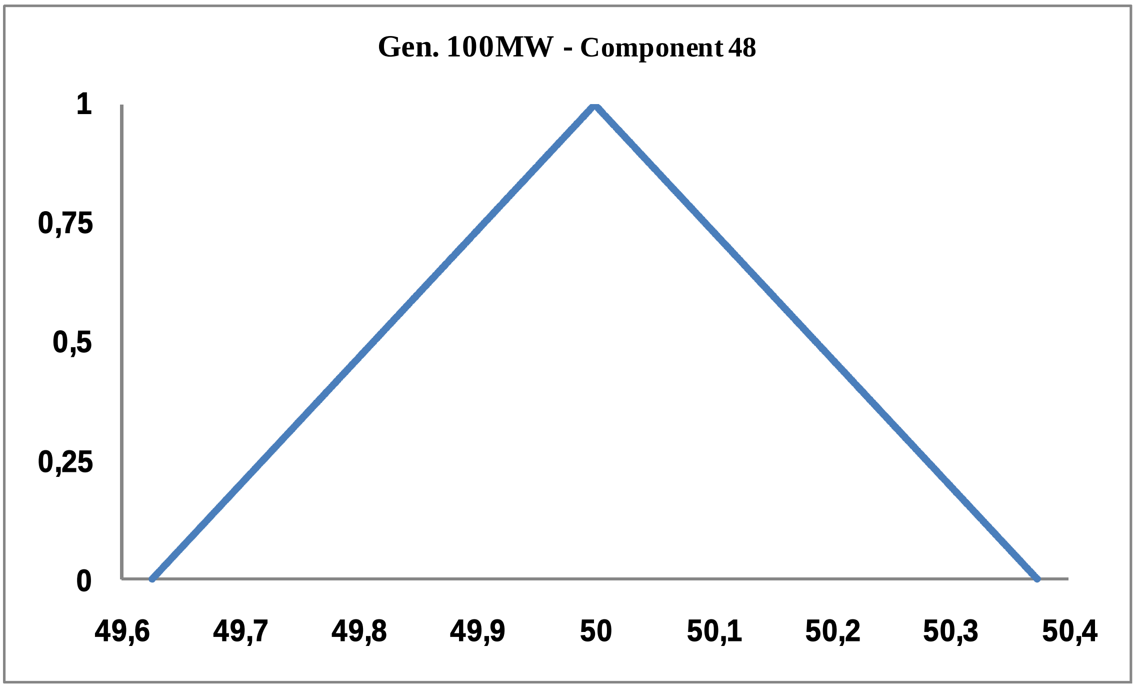

Gen. 20MW - Component 43
1
0.75
0.5
0.25
0
49.6
49.7
49.8
49.9
50
50.1
50.2
50.3
50.4

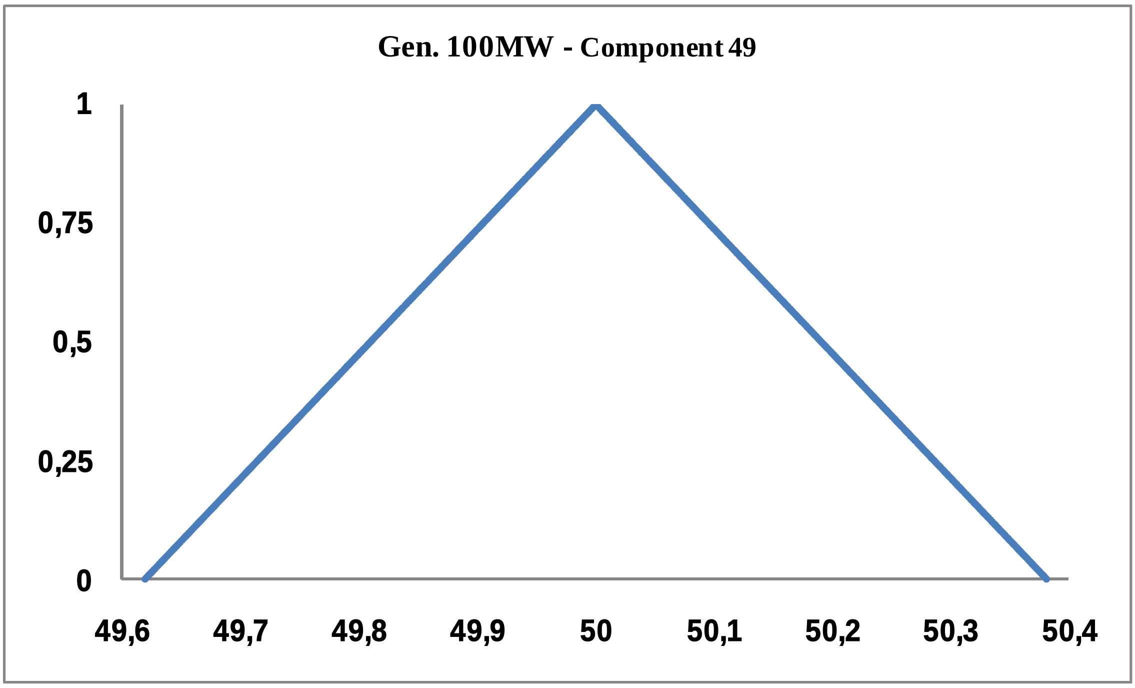

Gen. 20MW - Component 44
1
0.75
0.5
0.25
0
49.6
49.7
49.8
49.9
50
50.1
50.2
50.3
50.4

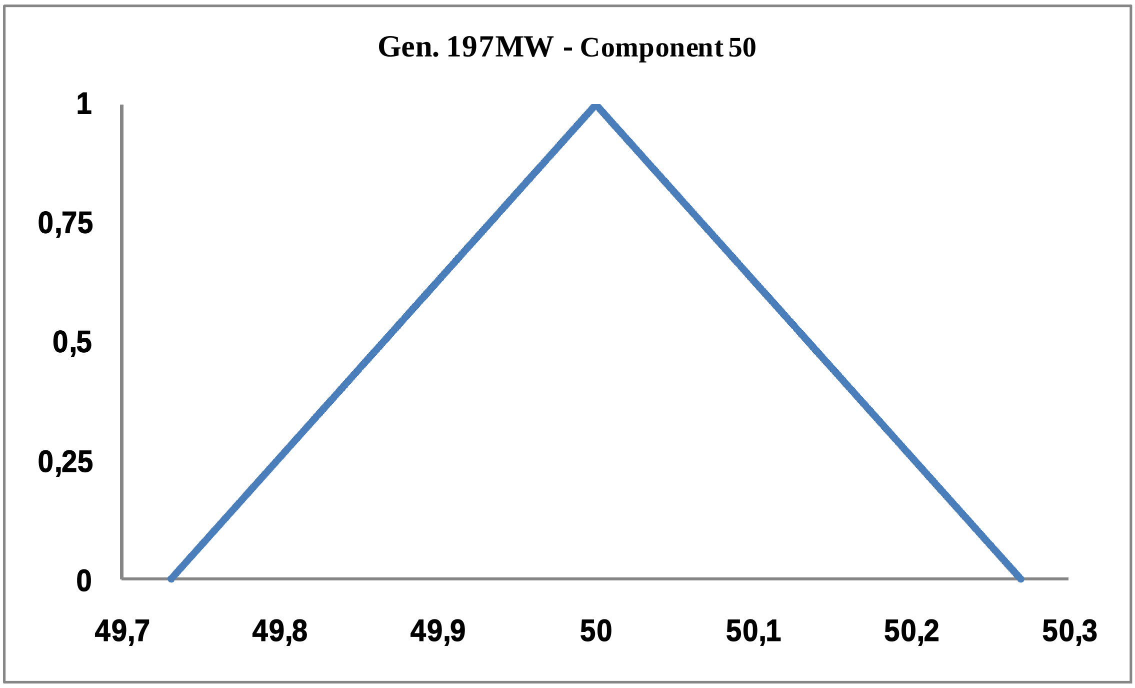

Gen. 76MW - Component 45
1
0.75
0.5
0.25
0
39.6
39.7
39.8
39.9
40
40.1
40.2
40.3
40.4

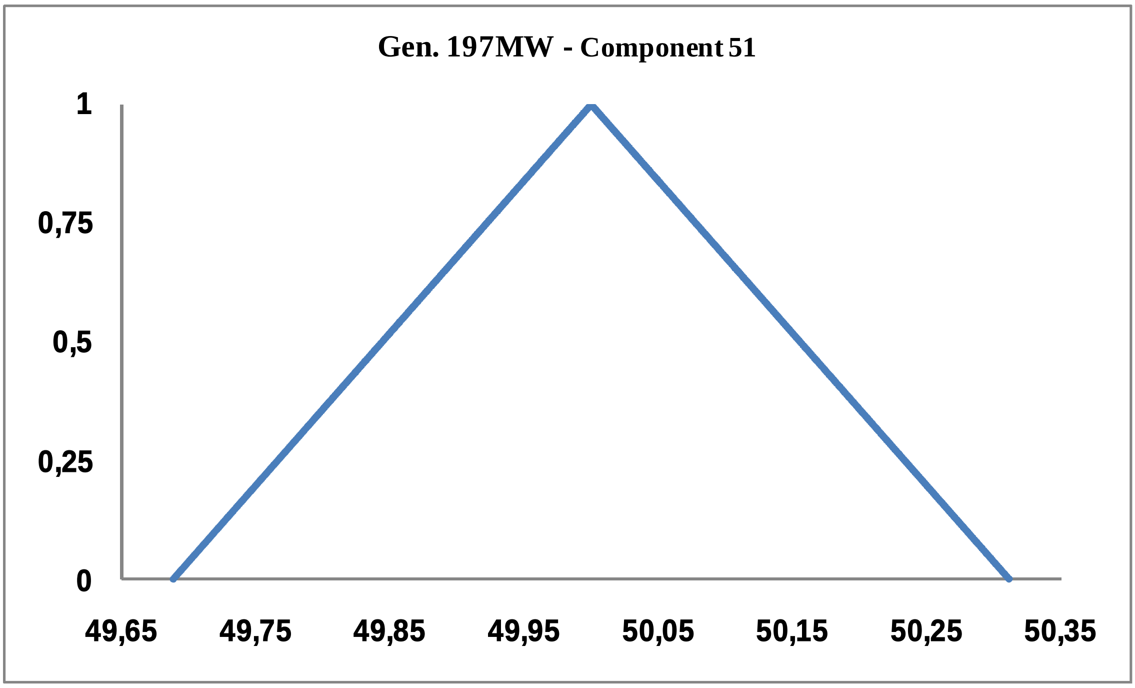

Gen. 76MW - Component 46
1
0.75
0.5
0.25
0
39.6
39.7
39.8
39.9
40
40.1
40.2
40.3
40.4

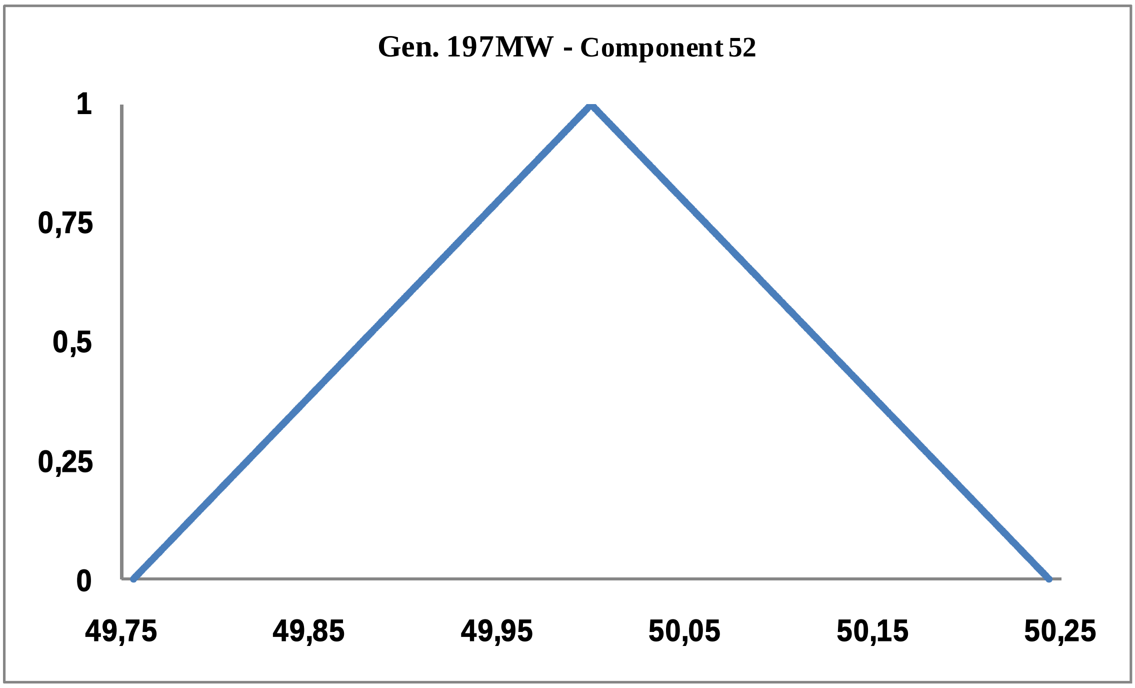

Gen. 100MW - Component 47
1
0,75
0,5
0,25
0
49,6
49,7
49,8
49,9
50
50,1
50,2
50,3
50,4

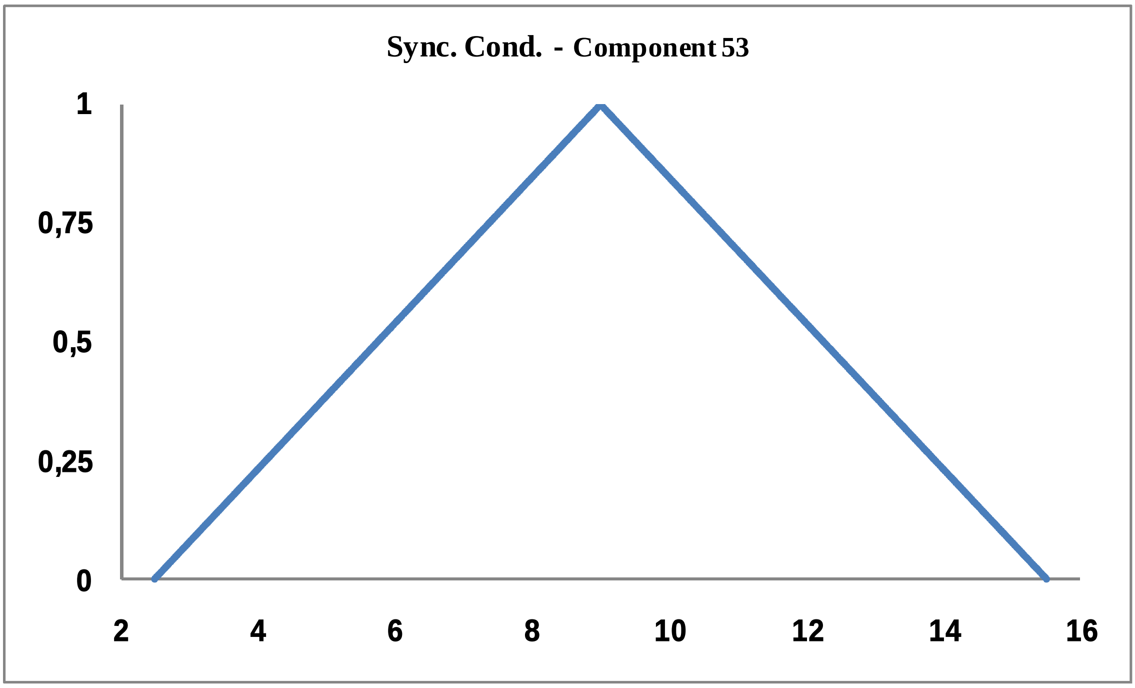

Gen. 100MW - Component 48
1
0,75
0,5
0,25
0
49,6
49,7
49,8
49,9
50
50,1
50,2
50,3
50,4

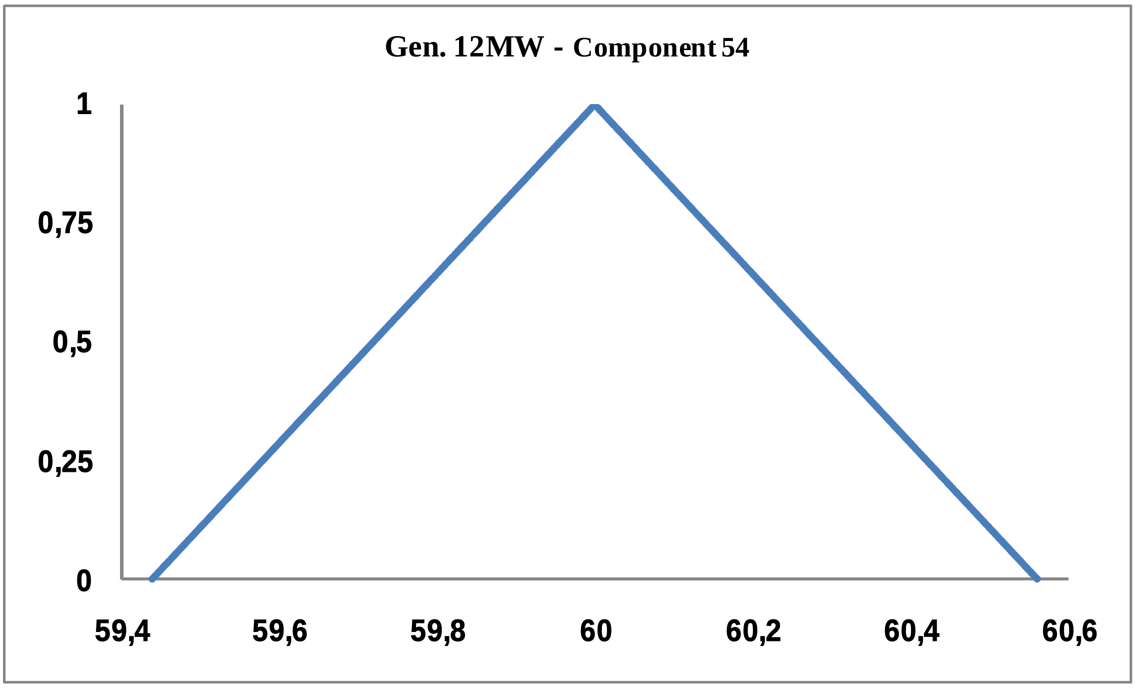

Gen. 100MW - Component 49
1
0,75
0,5
0,25
0
49,6
49,7
49,8
49,9
50
50,1
50,2
50,3
50,4

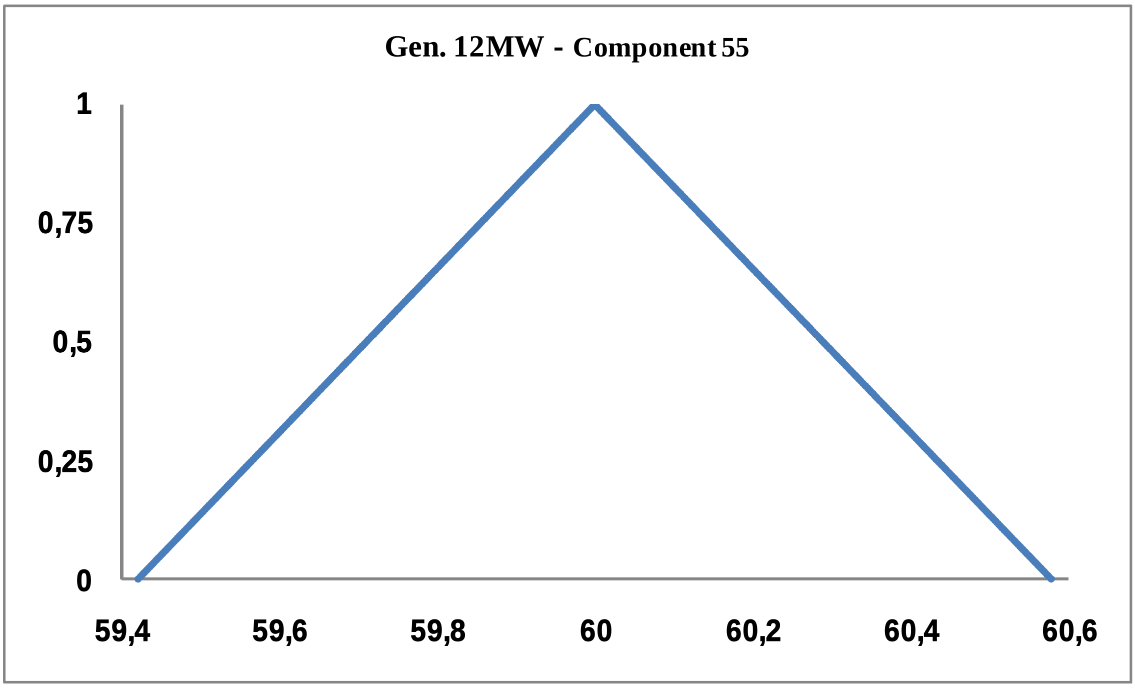

Gen. 197MW - Component 50
1
0,75
0,5
0,25
0
49,7
49,8
49,9
50
50,1
50,2
50,3

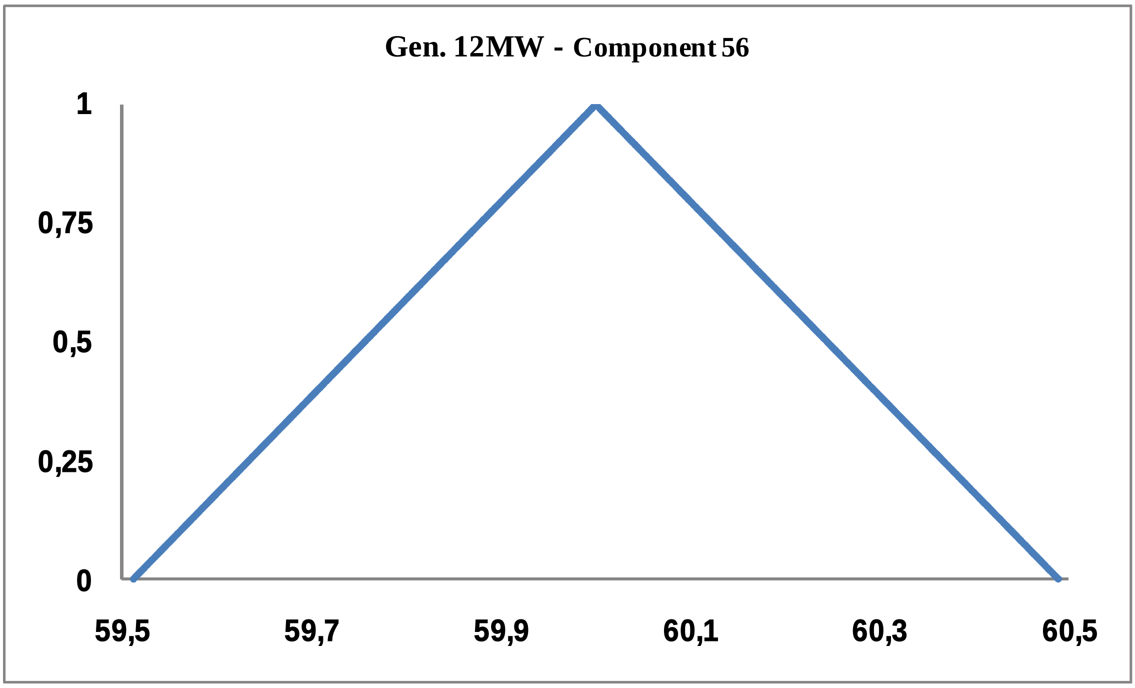

Gen. 197MW - Component 51
1
0,75
0,5
0,25
0
49,65
49,75
49,85
49,95
50,05
50,15
50,25
50,35

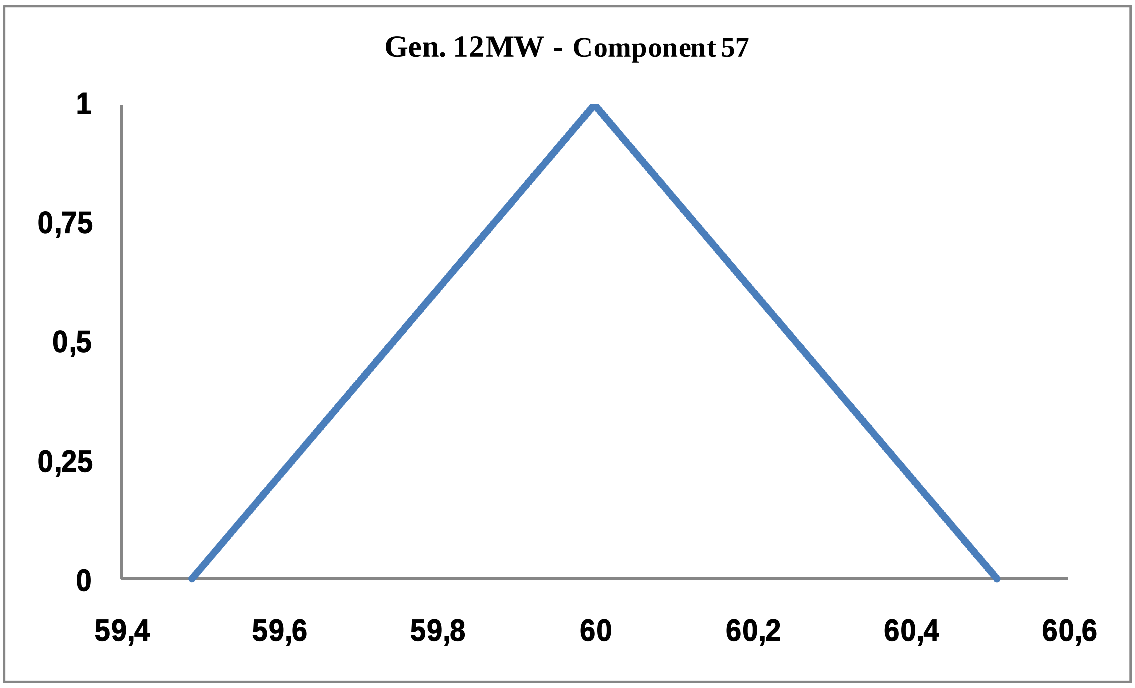

Gen. 197MW - Component 52
1
0,75
0,5
0,25
0
49,75
49,85
49,95
50,05
50,15
50,25

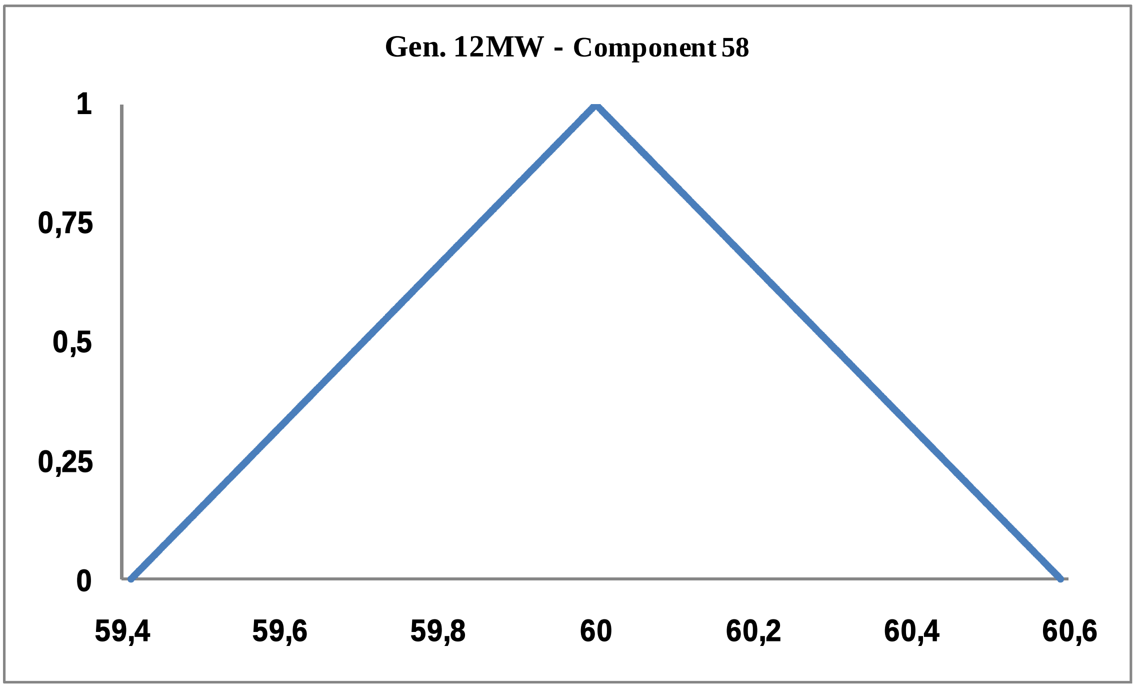

Sync. Cond. - Component 53
1
0,75
0,5
0,25
0
2
4
6
8
10
12
14
16

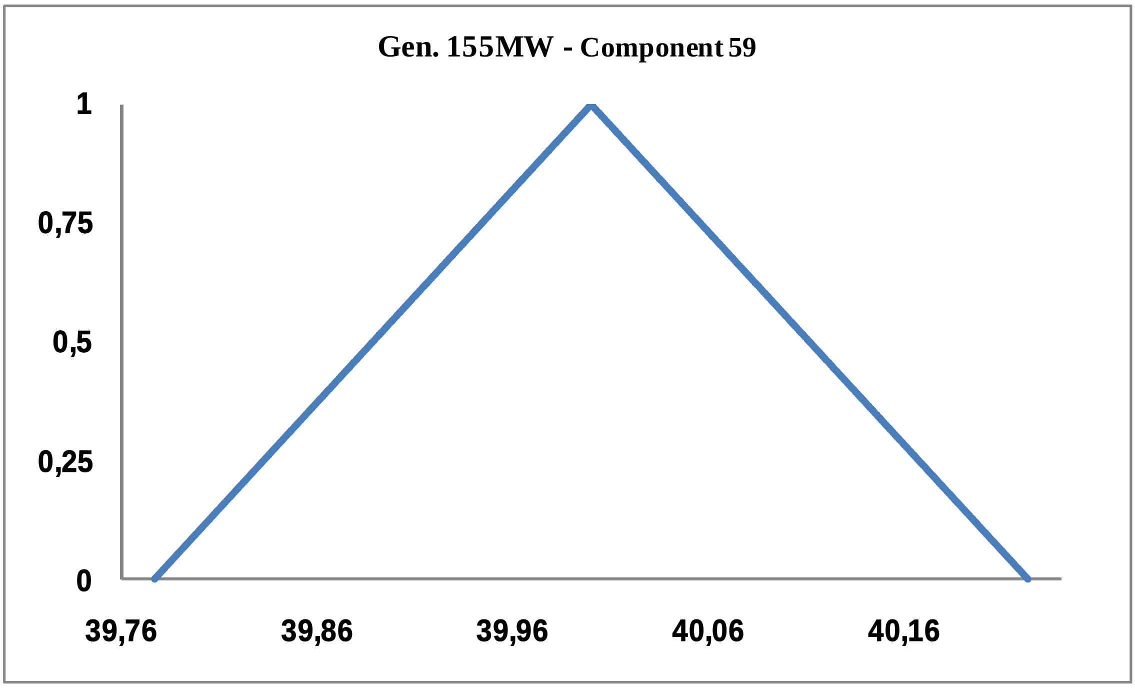

Gen. 12MW - Component 54
1
0,75
0,5
0,25
0
59,4
59,6
59,8
60
60,2
60,4
60,6

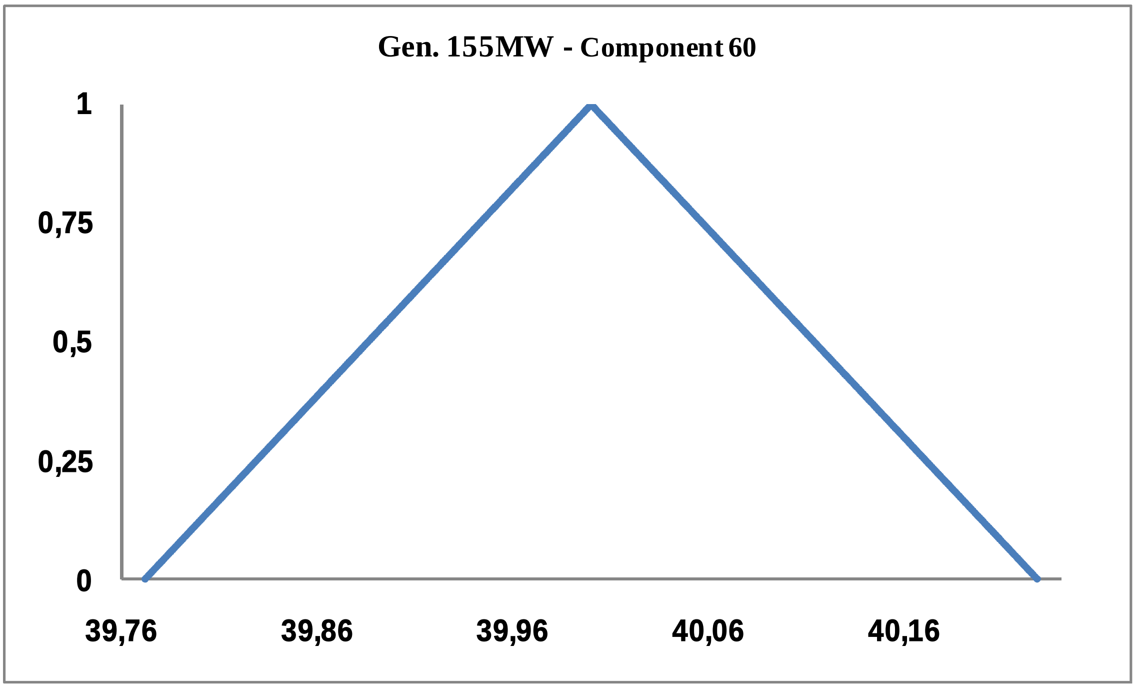

Gen. 12MW - Component 55
1
0,75
0,5
0,25
0
59,4
59,6
59,8
60
60,2
60,4
60,6

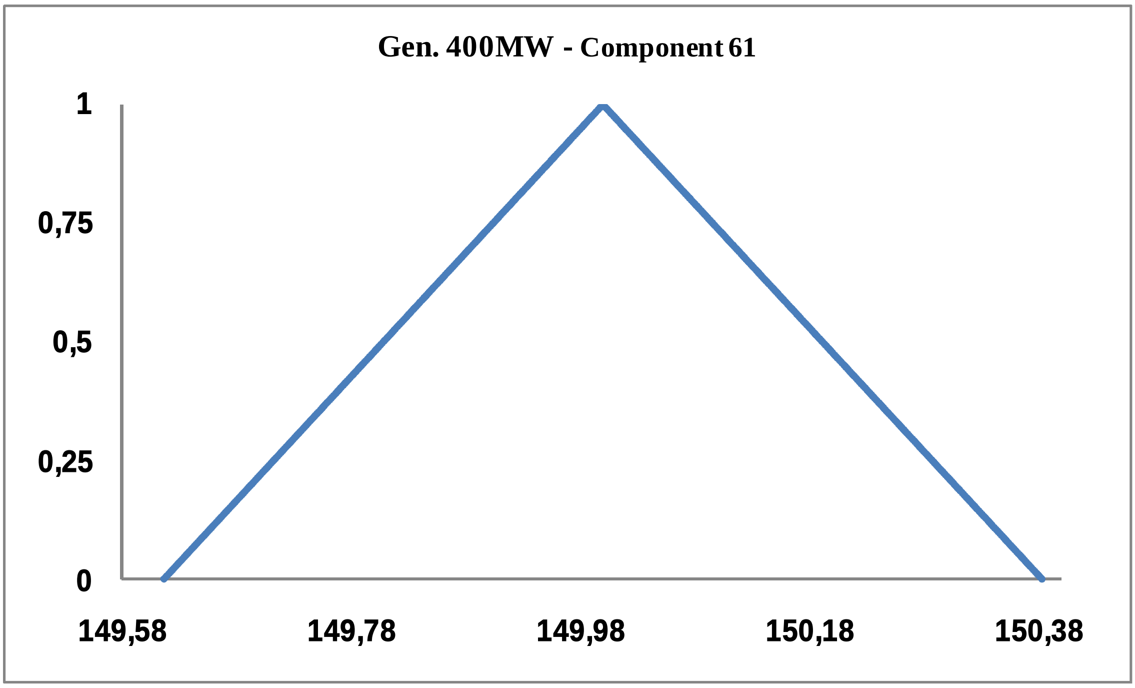

Gen. 12MW - Component 56
1
0,75
0,5
0,25
0
59,5
59,7
59,9
60,1
60,3
60,5

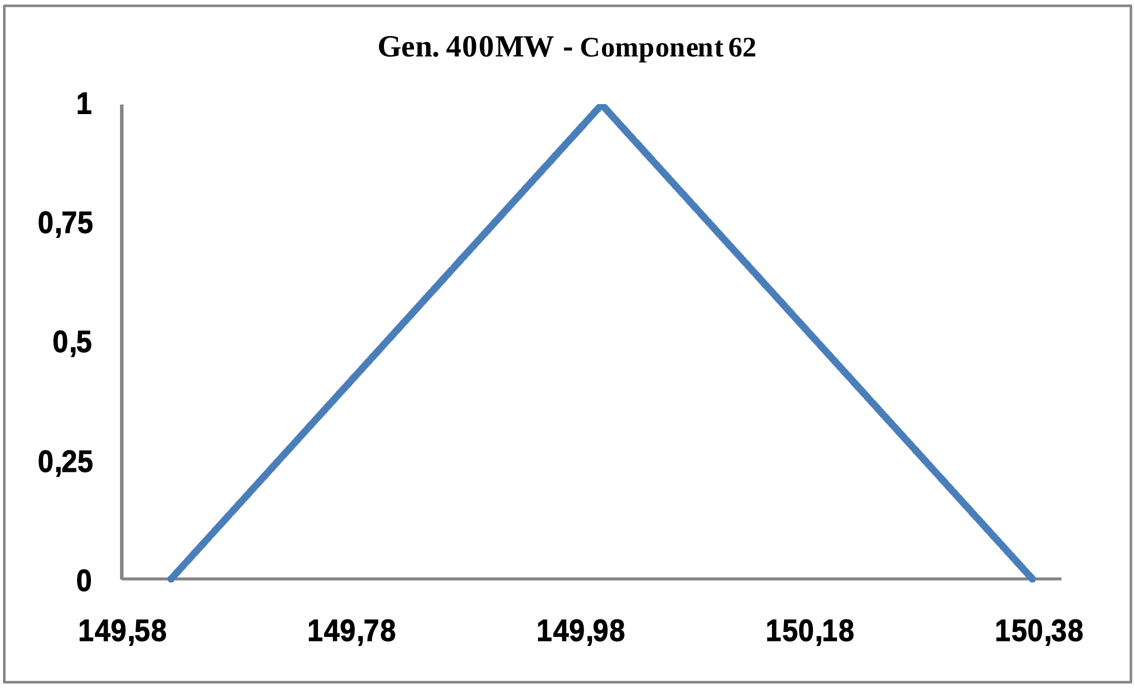

Gen. 12MW - Component 57
1
0,75
0,5
0,25
0
59,4
59,6
59,8
60
60,2
60,4
60,6

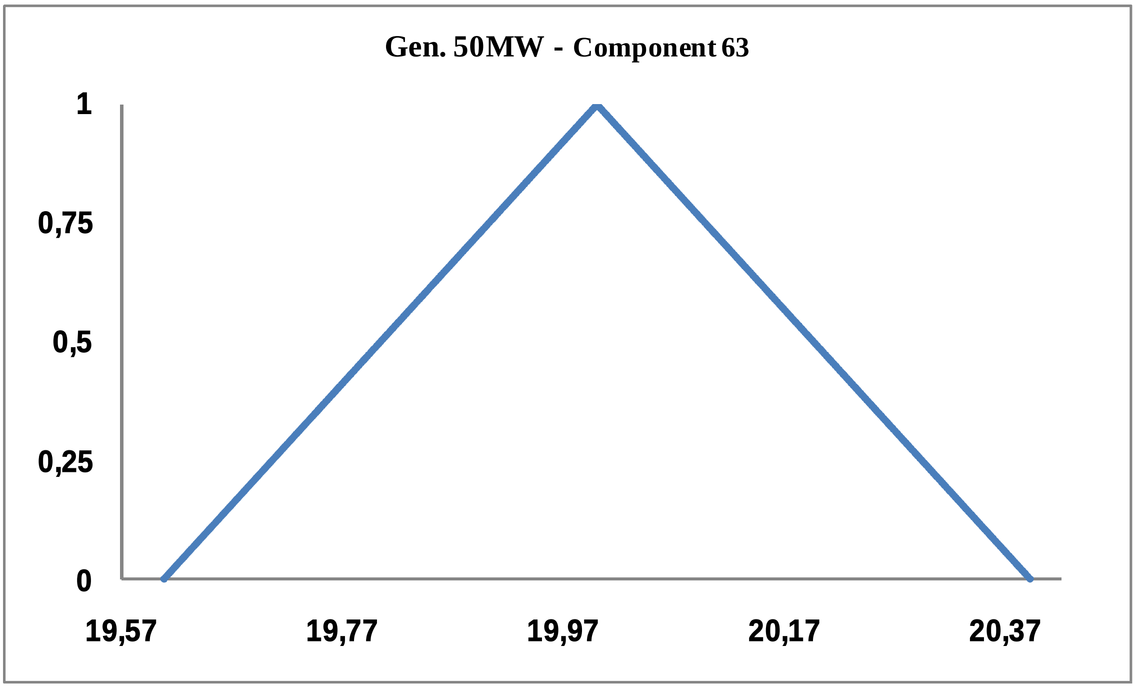

Gen. 12MW - Component 58
1
0,75
0,5
0,25
0
59,4
59,6
59,8
60
60,2
60,4
60,6

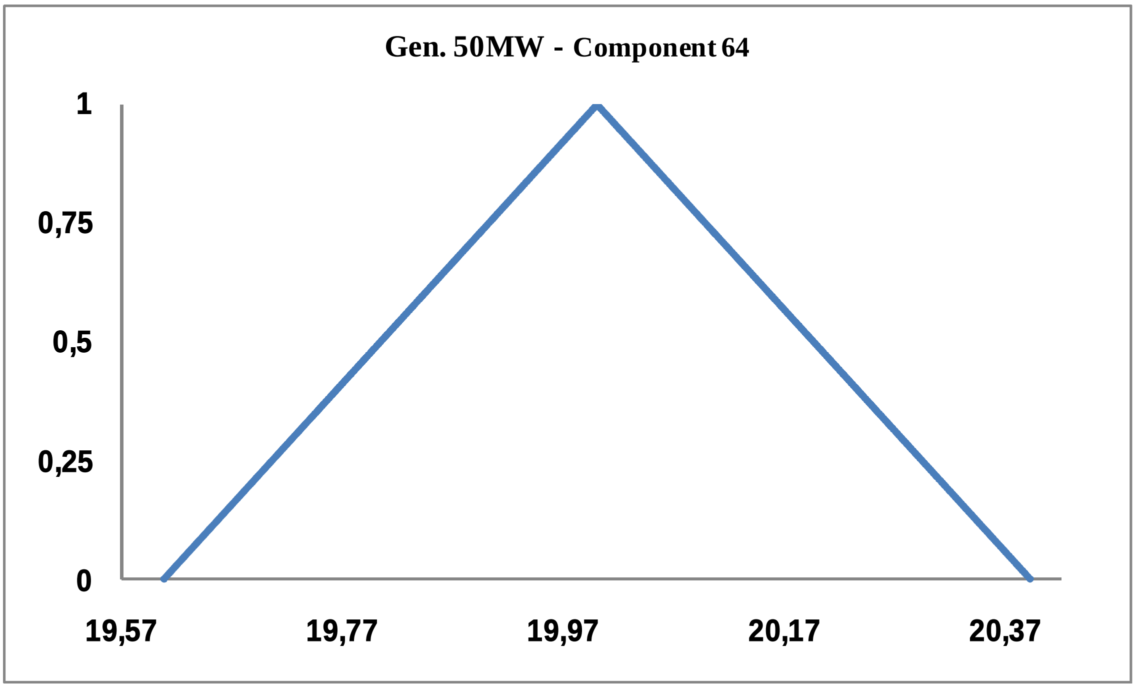

Gen. 155MW - Component 59
1
0,75
0,5
0,25
0
39,76
39,86
39,96
40,06
40,16

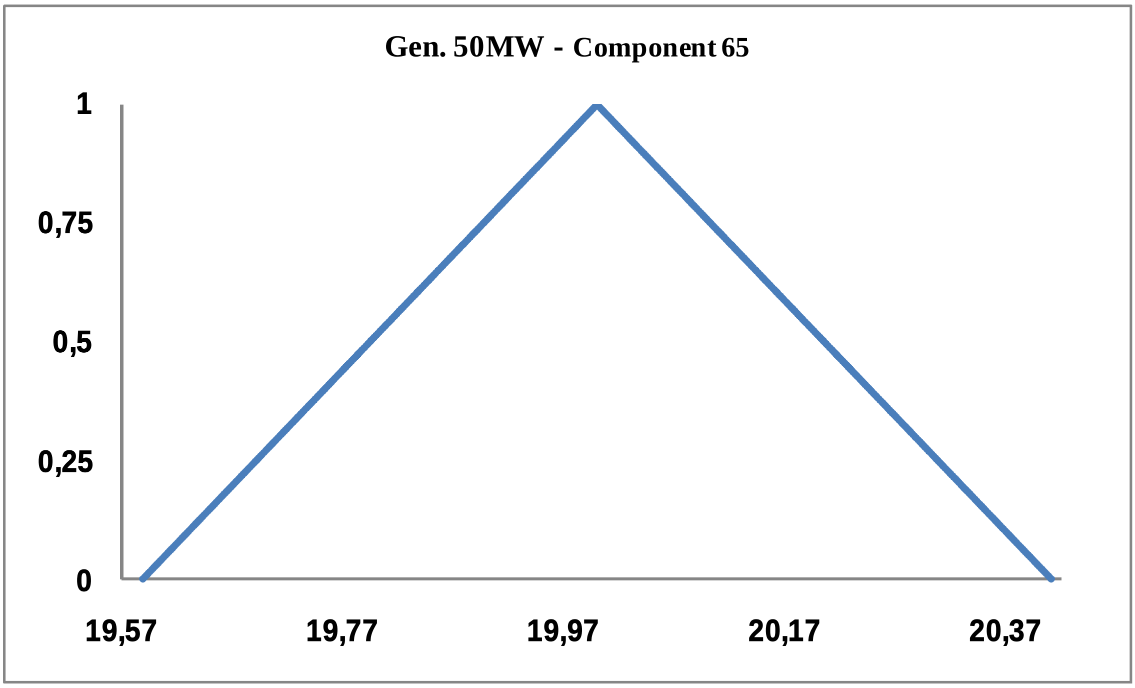

Gen. 155MW - Component 60
1
0,75
0,5
0,25
0
39,76
39,86
39,96
40,06
40,16

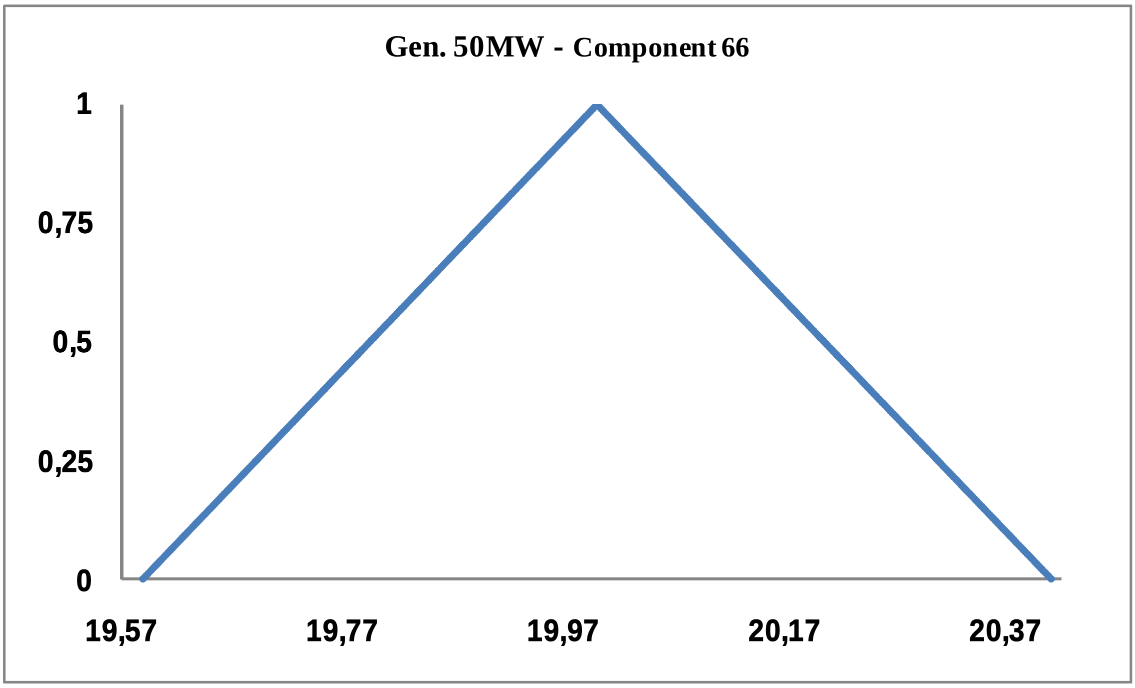

Gen. 400MW - Component 61
1
0,75
0,5
0,25
0
149,58
149,78
149,98
150,18
150,38

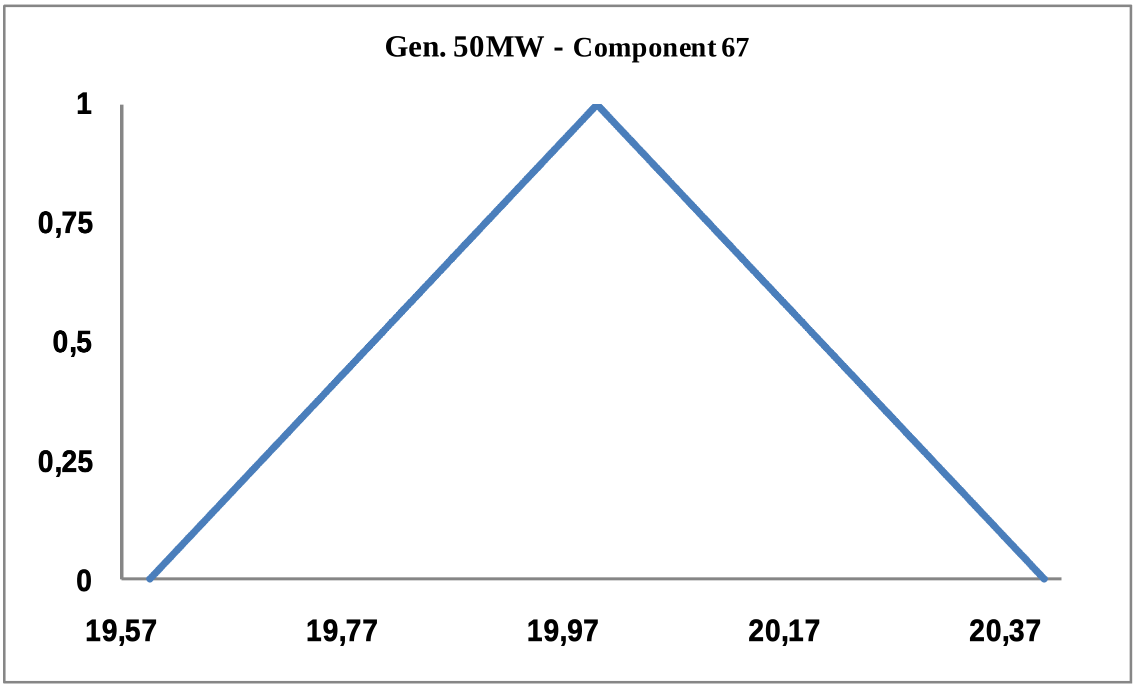

Gen. 400MW - Component 62
1
0,75
0,5
0,25
0
149,58
149,78
149,98
150,18
150,38

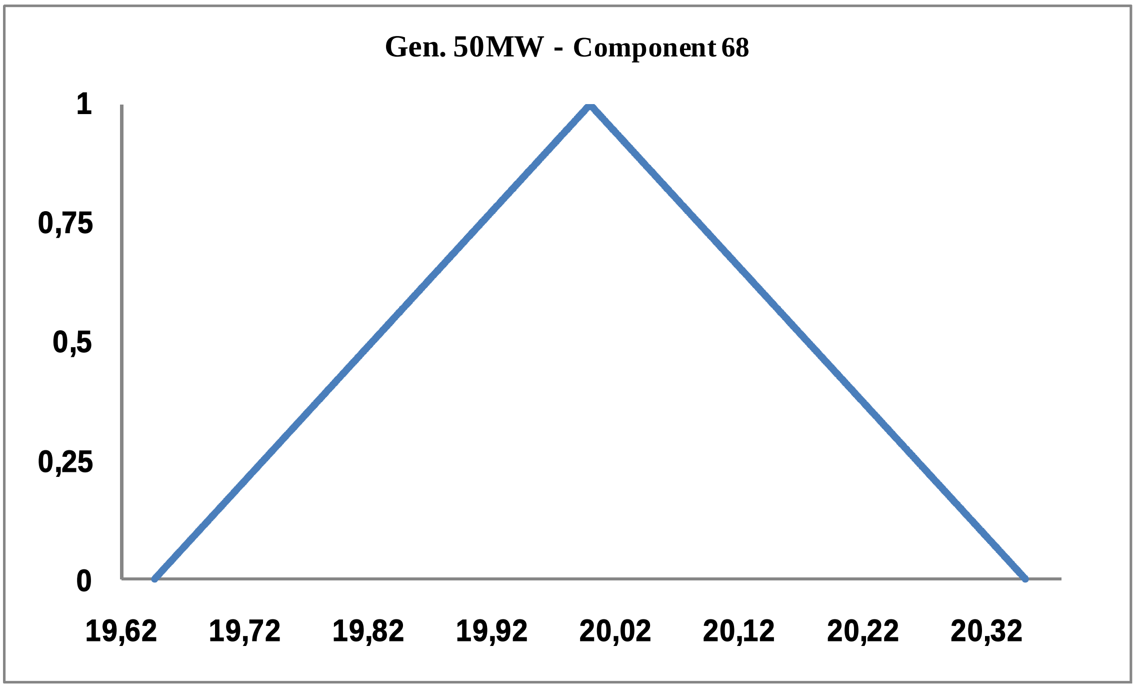

Gen. 50MW - Component 63
1
0,75
0,5
0,25
0
19,57
19,77
19,97
20,17
20,37

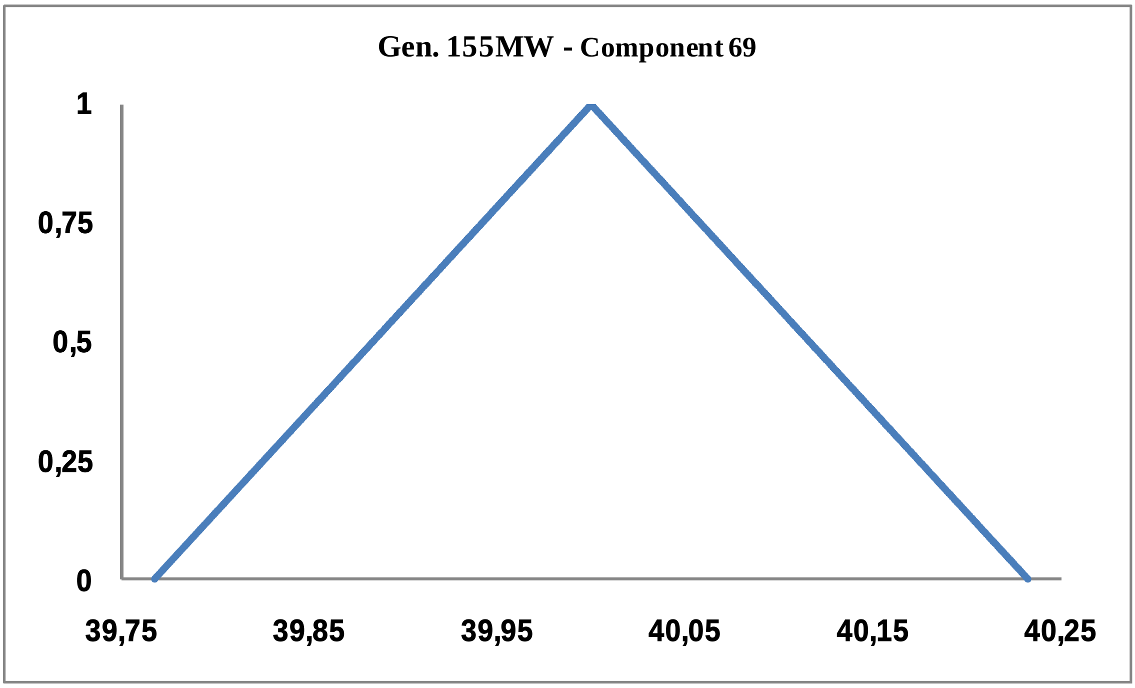

Gen. 50MW - Component 64
1
0,75
0,5
0,25
0
19,57
19,77
19,97
20,17
20,37

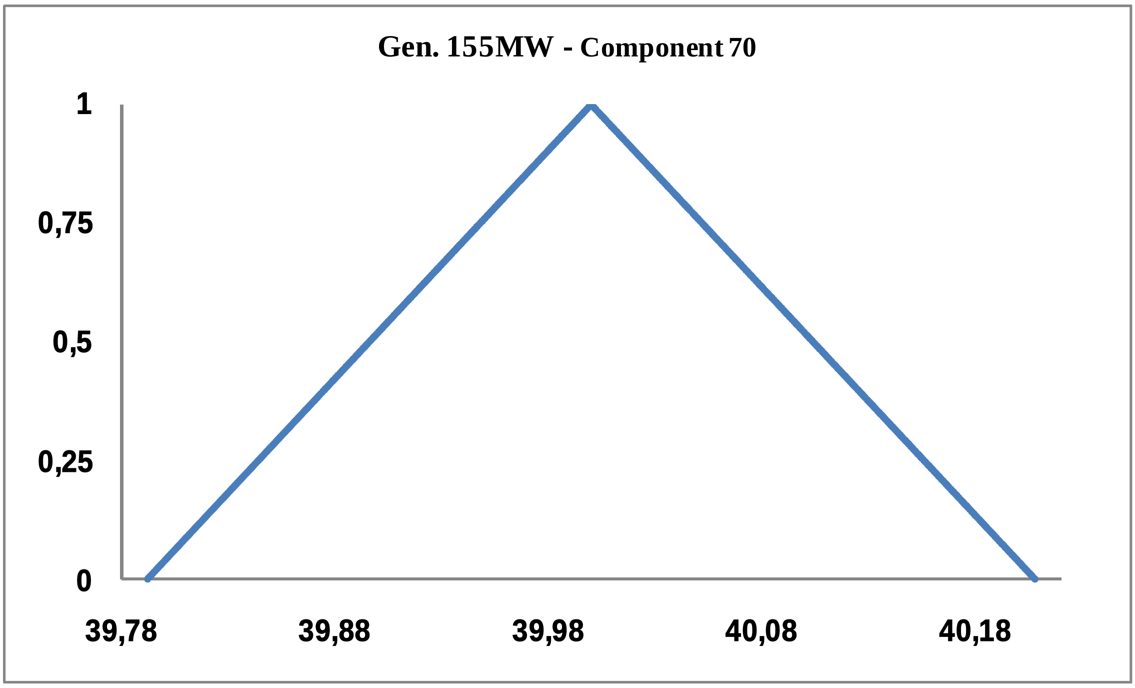

Gen. 50MW - Component 65
1
0,75
0,5
0,25
0
19,57
19,77
19,97
20,17
20,37

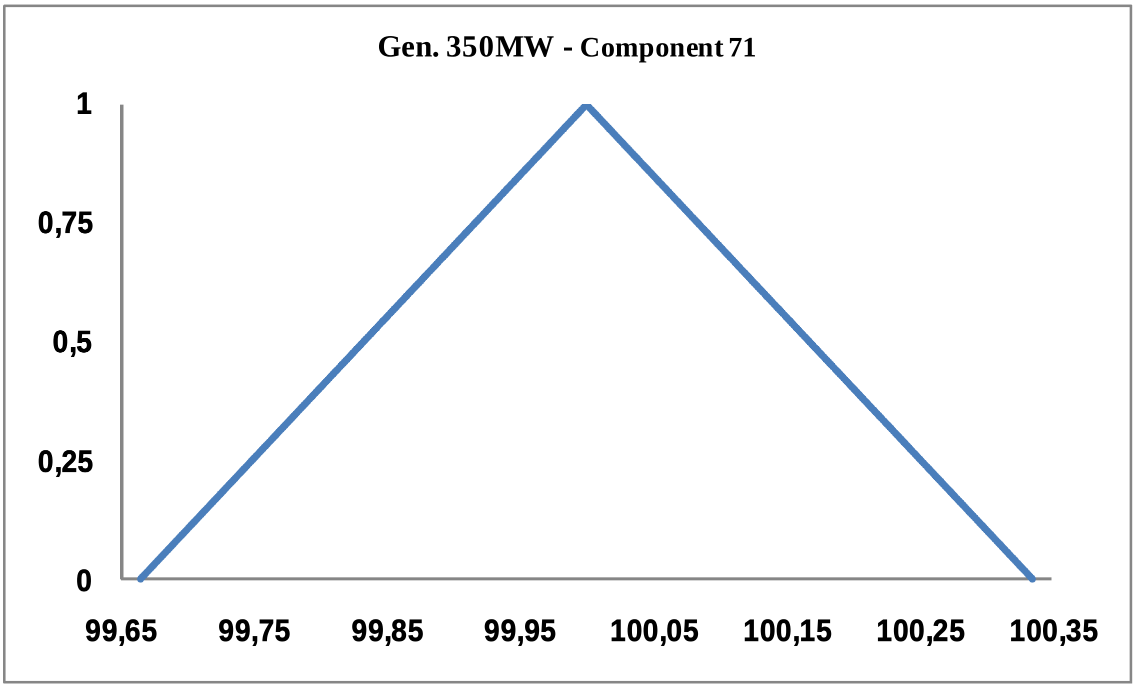

Gen. 50MW - Component 66
1
0,75
0,5
0,25
0
19,57
19,77
19,97
20,17
20,37


Gen. 50MW - Component 67
1
0,75
0,5
0,25
0
19,57
19,77
19,97
20,17
20,37


Gen. 50MW - Component 68
1
0,75
0,5
0,25
0
19,62
19,72
19,82
19,92
20,02
20,12
20,22
20,32

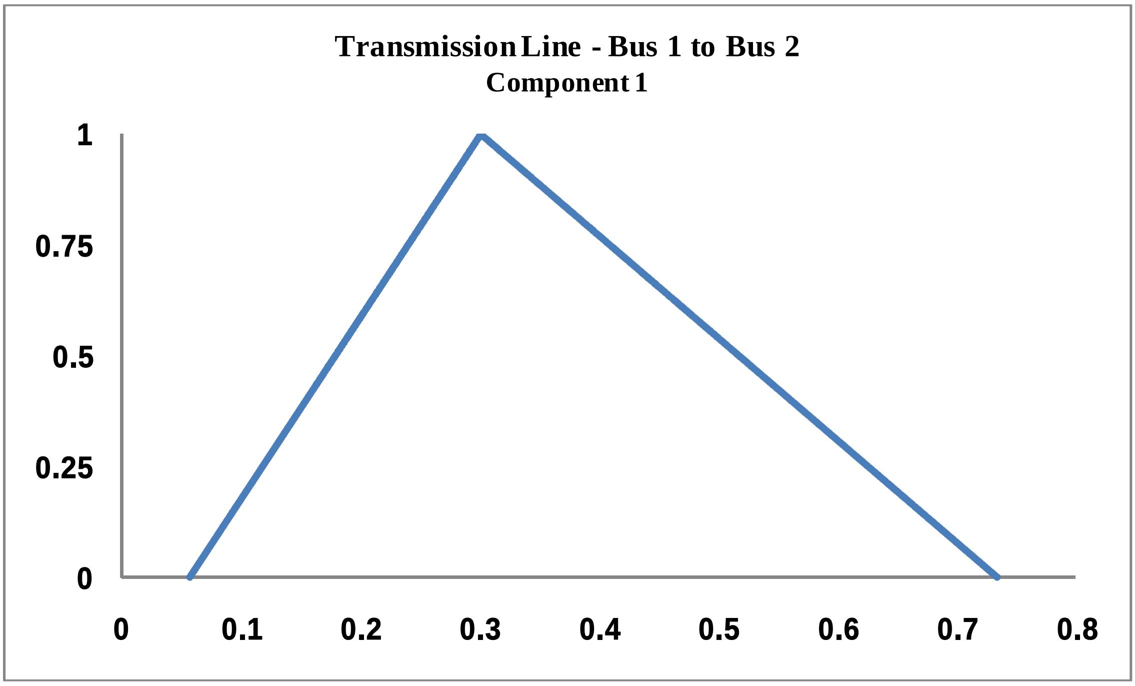

Gen. 155MW - Component 69

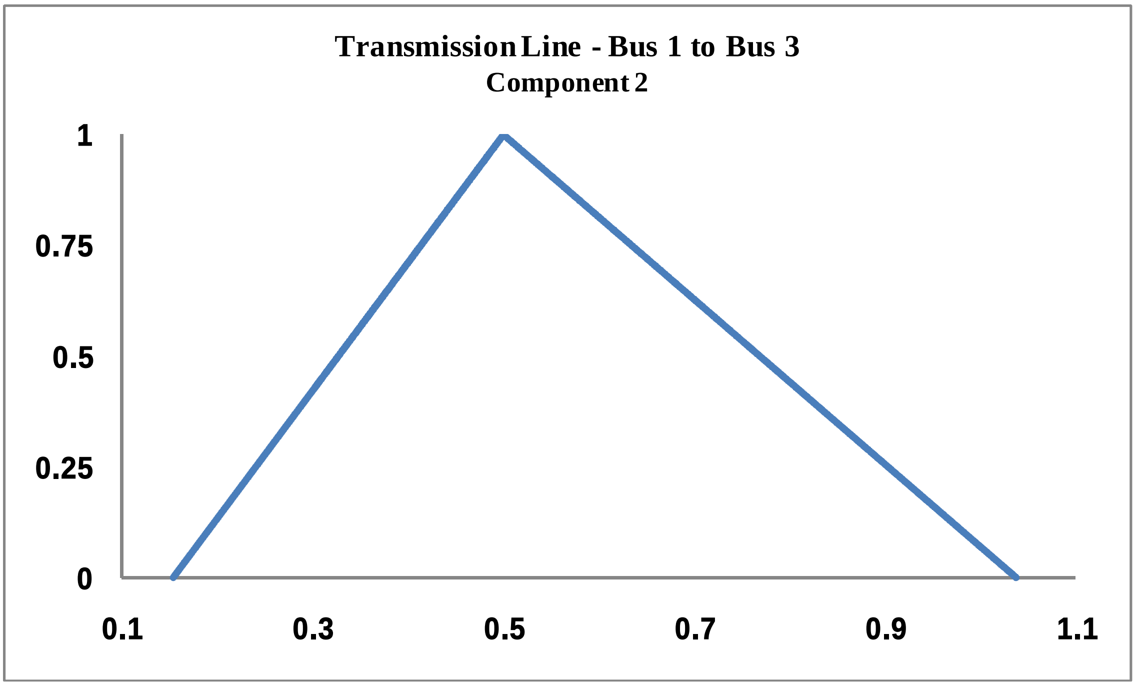

Gen. 155MW - Component 70

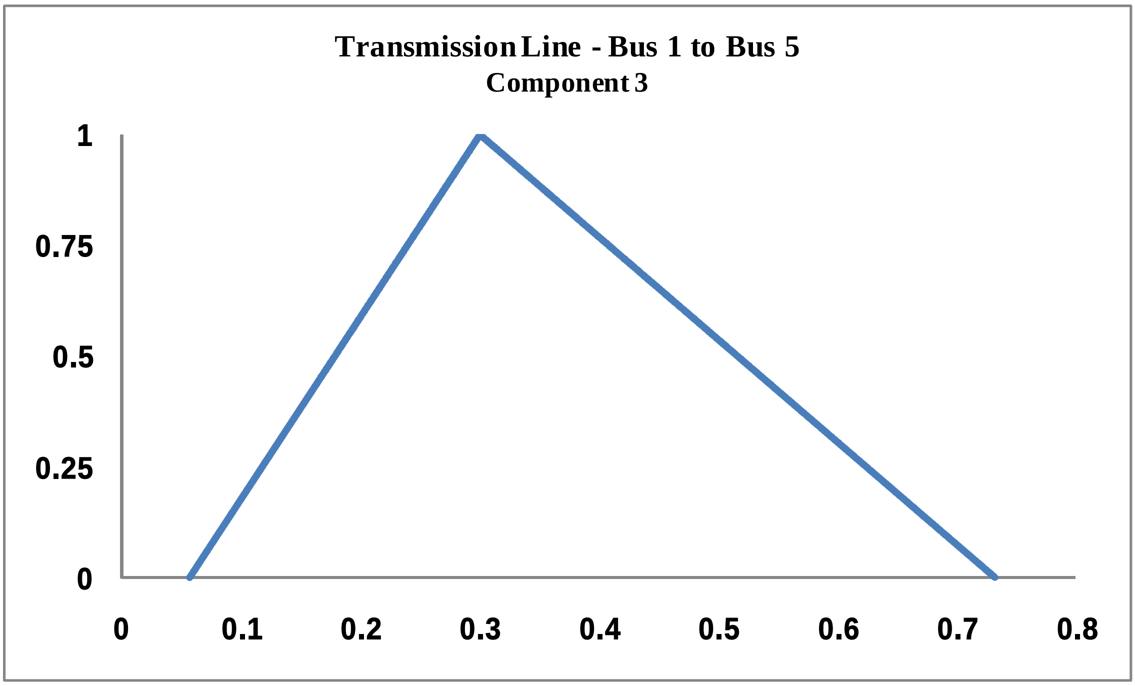

Gen. 350MW - Component 71
1
0,75
0,5
0,25
0
99,65
99,75
99,85
99,95
100,05
100,15
100,25
100,35

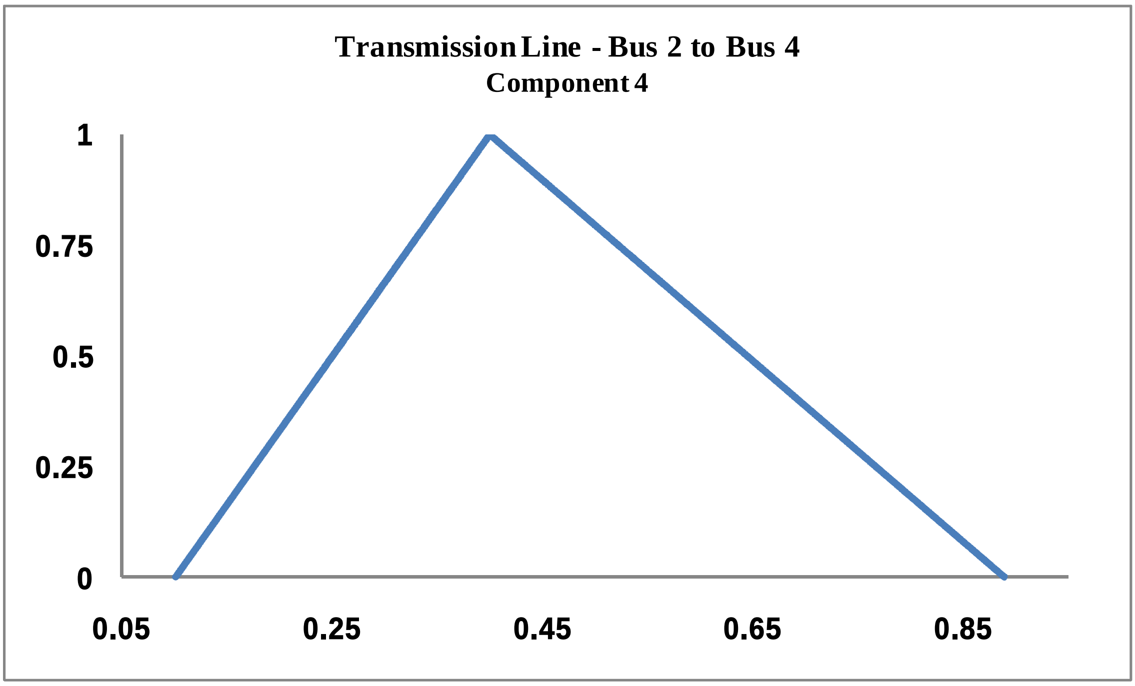
Annex 5

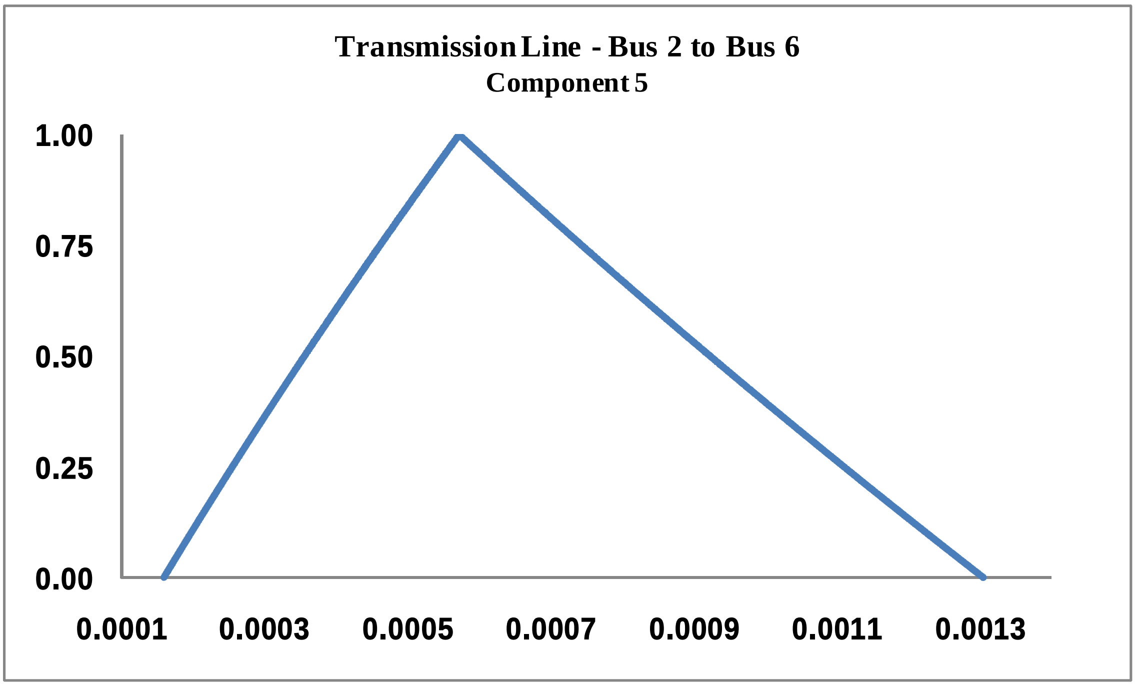
Fuzzy membership functions for Failure Rate (failures per year)

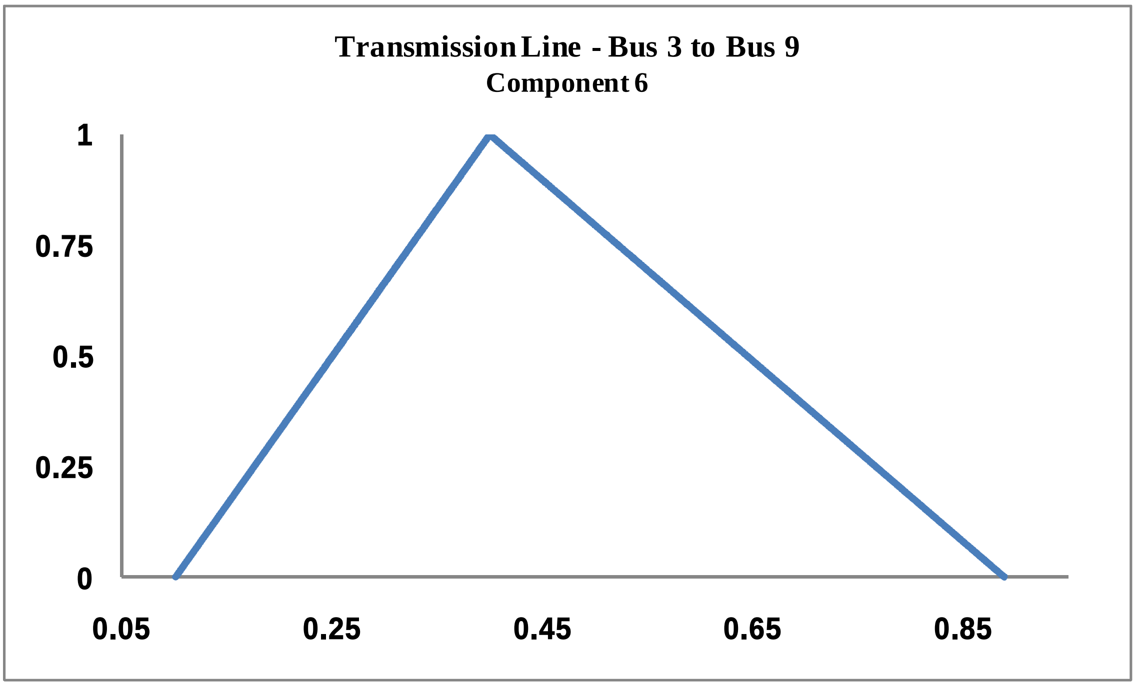


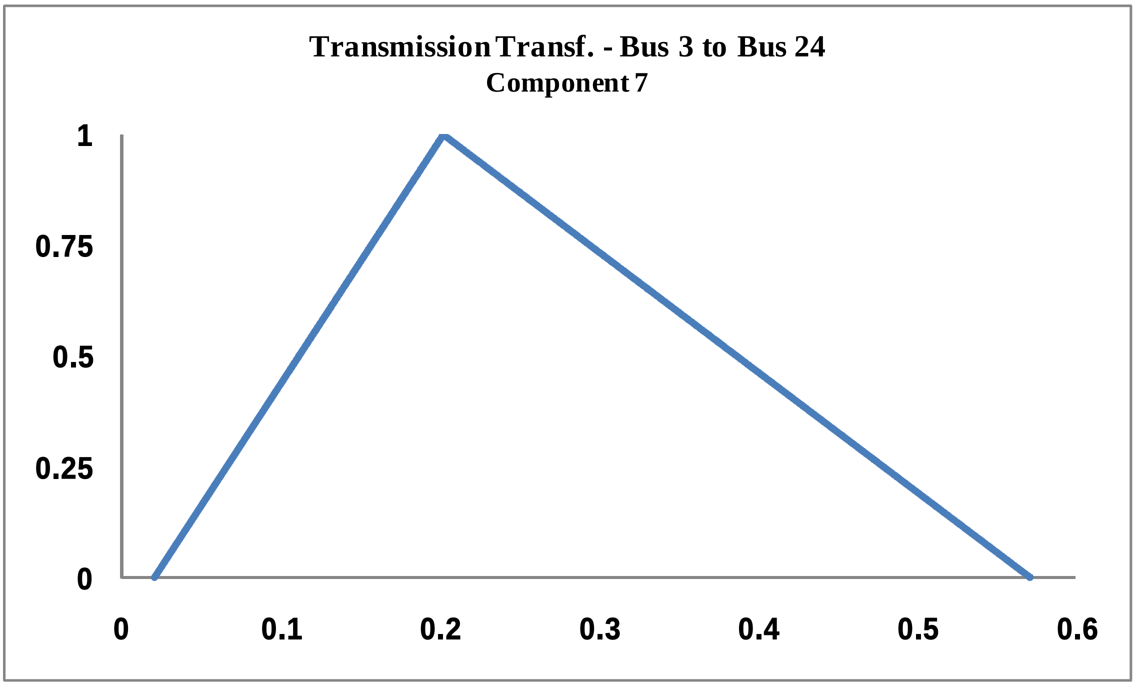


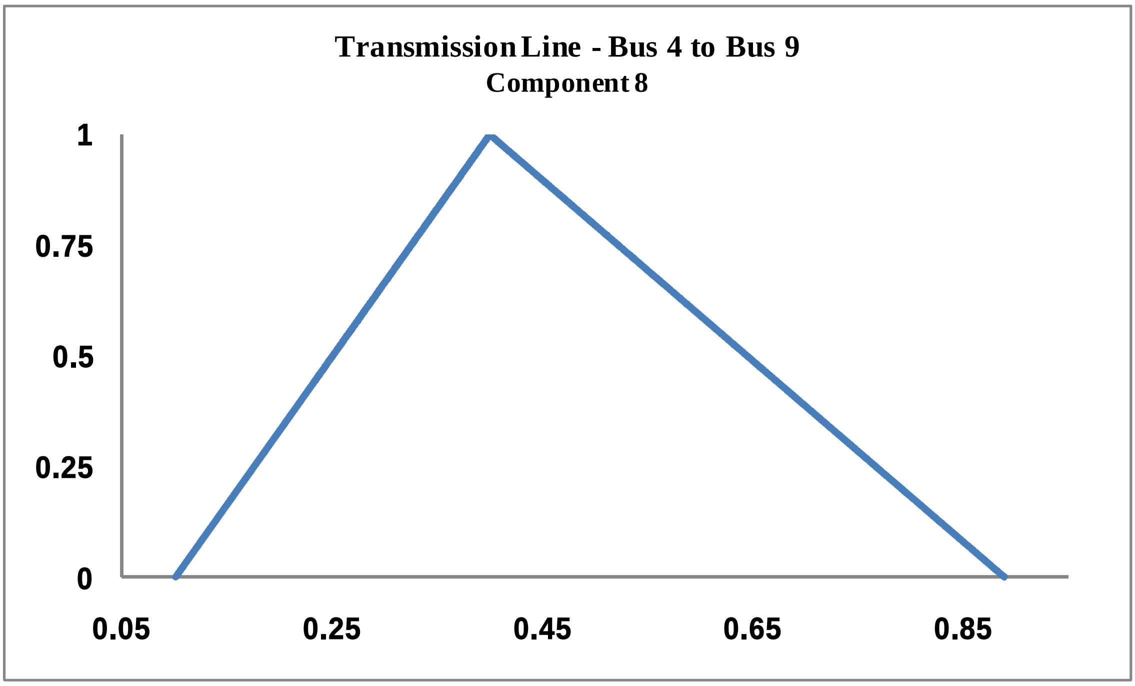

Transmission Line - Bus 1 to Bus 5
Component 3
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

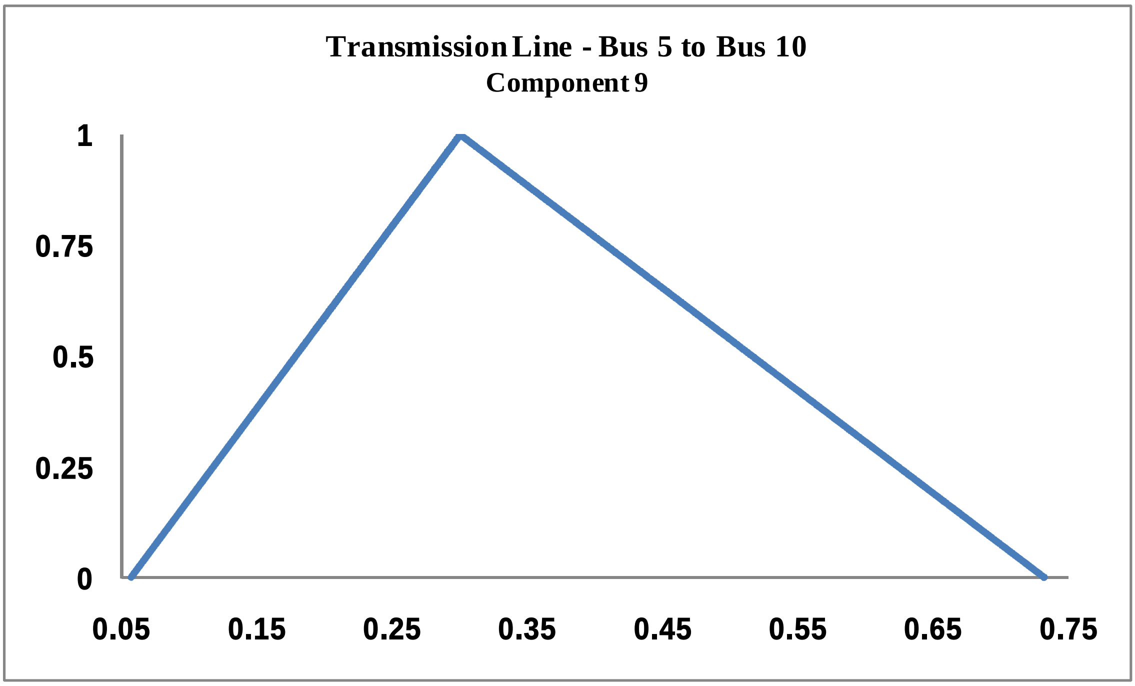

Transmission Line - Bus 2 to Bus 4
Component 4
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

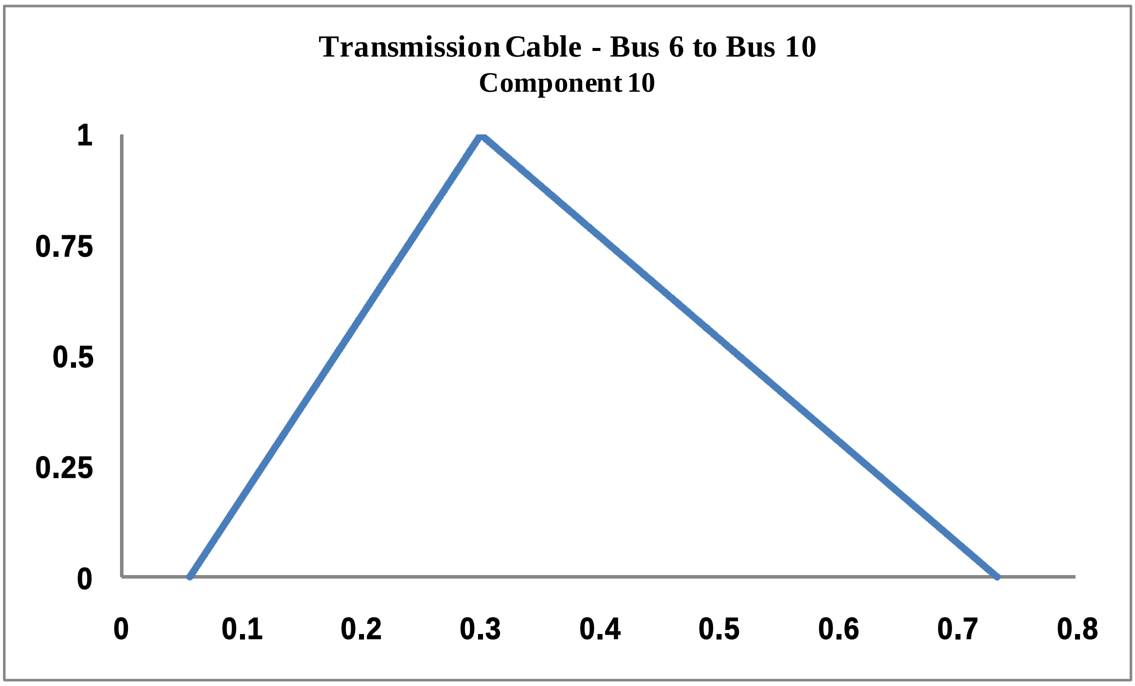

Transmission Line - Bus 2 to Bus 6
Component 5
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

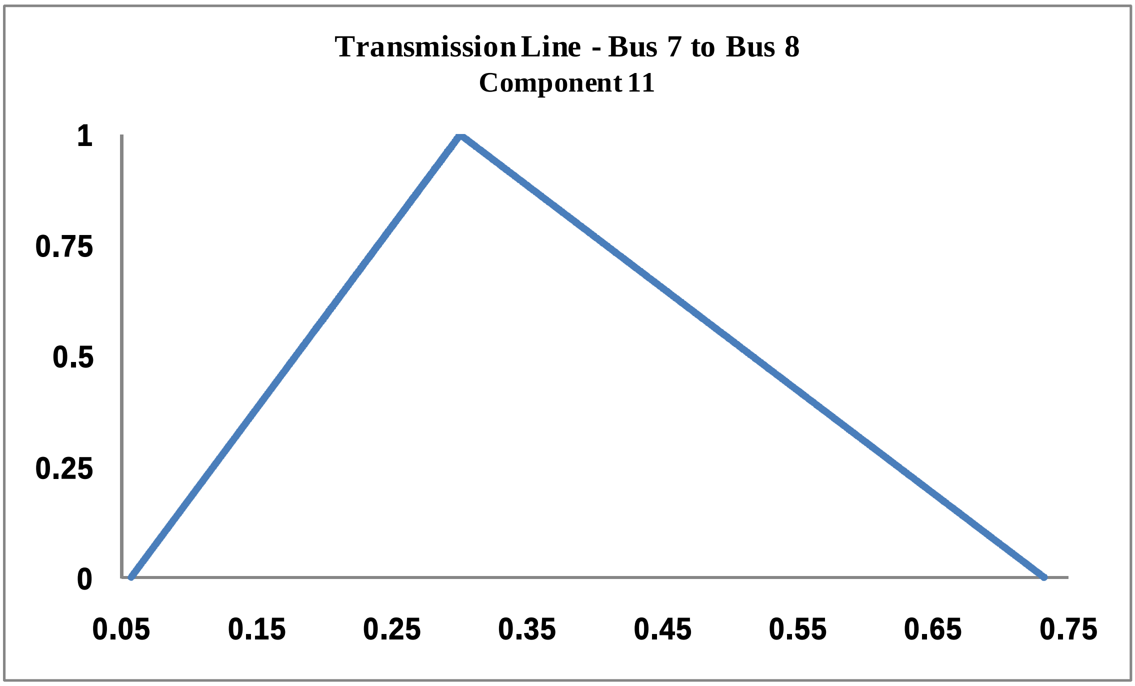

Transmission Line - Bus 3 to Bus 9
Component 6
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

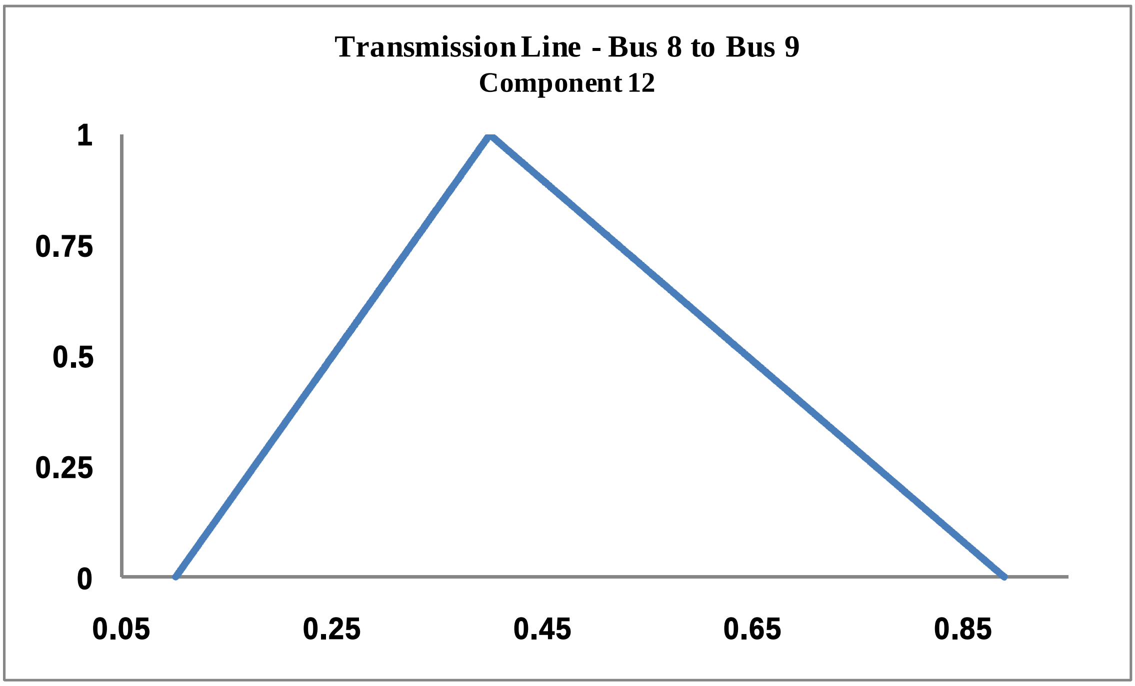

Transmission Transf. - Bus 3 to Bus 24
Component 7
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6

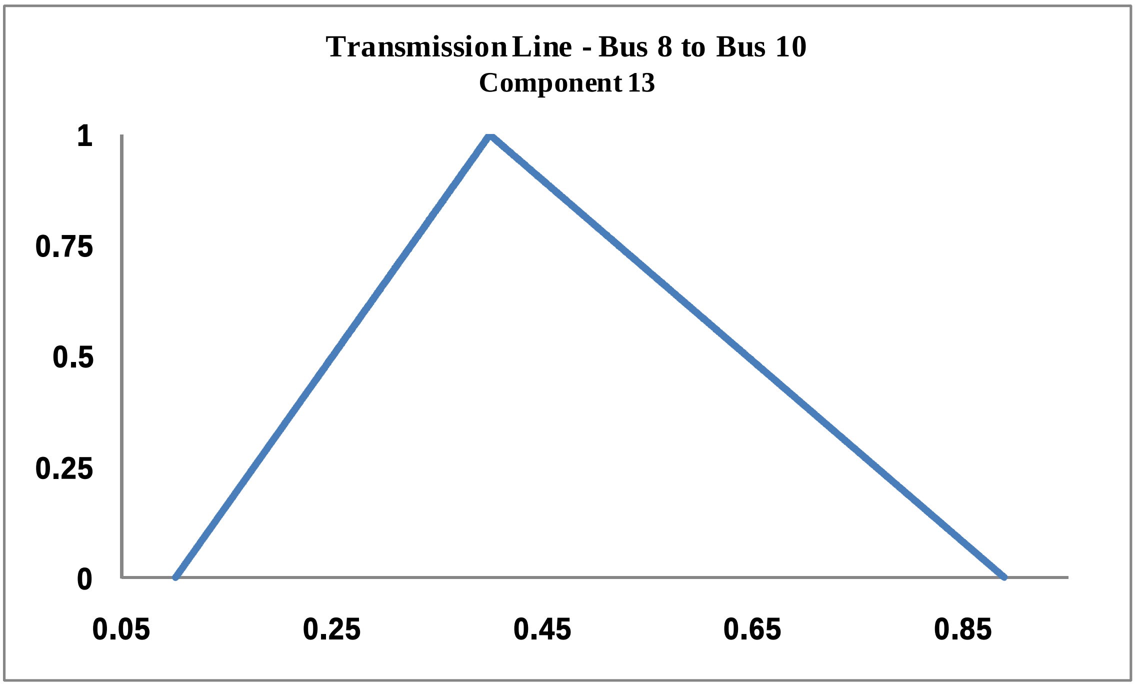

Transmission Line - Bus 4 to Bus 9
Component 8
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

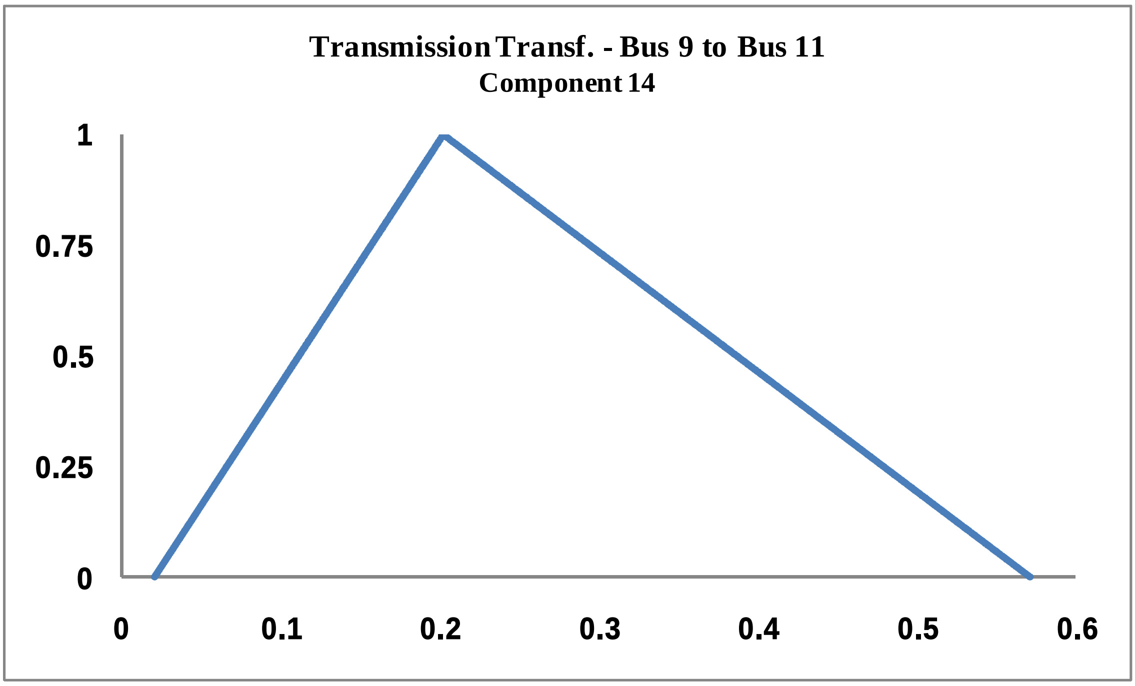

Transmission Line - Bus 5 to Bus 10
Component 9
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

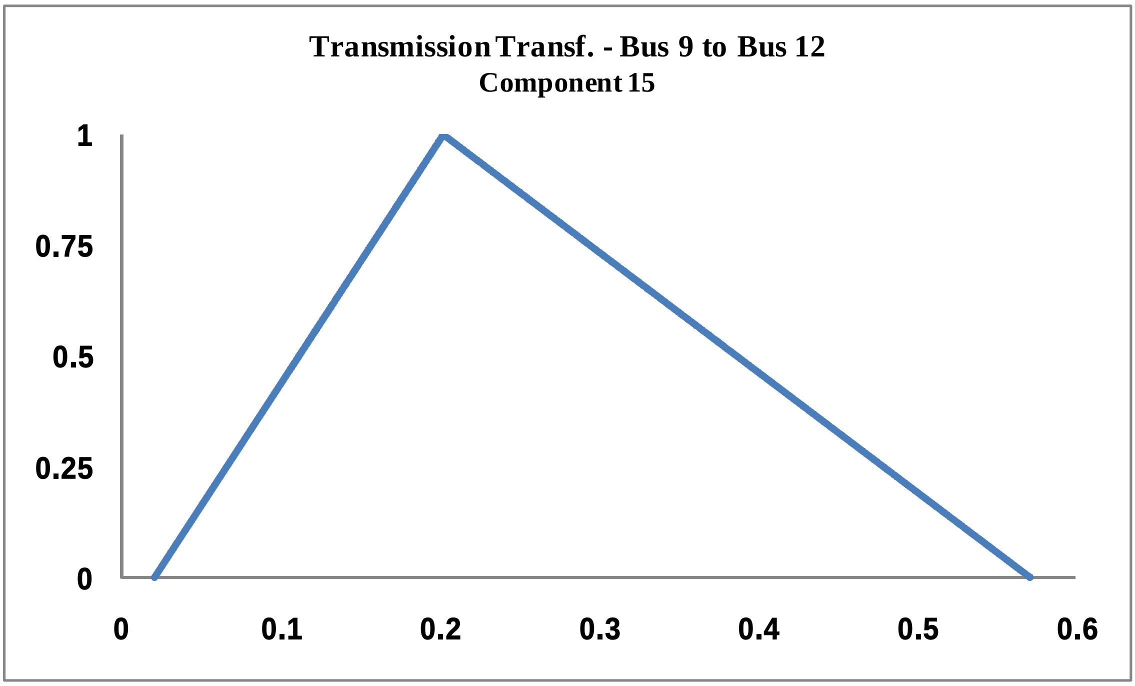

Transmission Cable - Bus 6 to Bus 10
Component 10
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

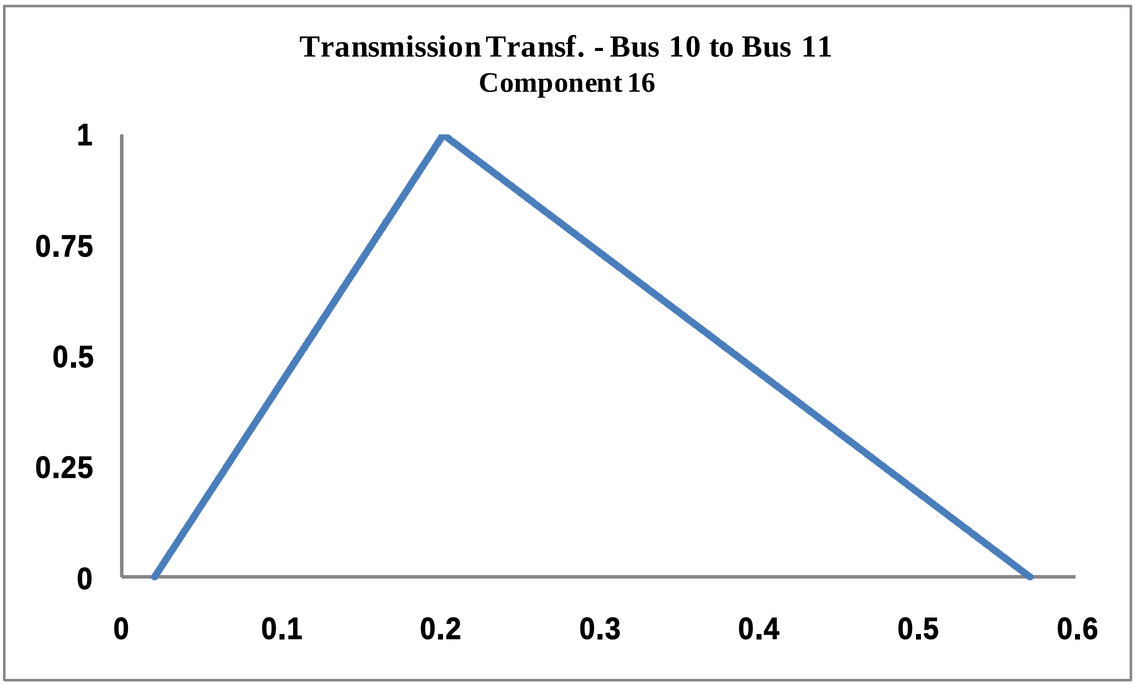

Transmission Line - Bus 7 to Bus 8
Component 11
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

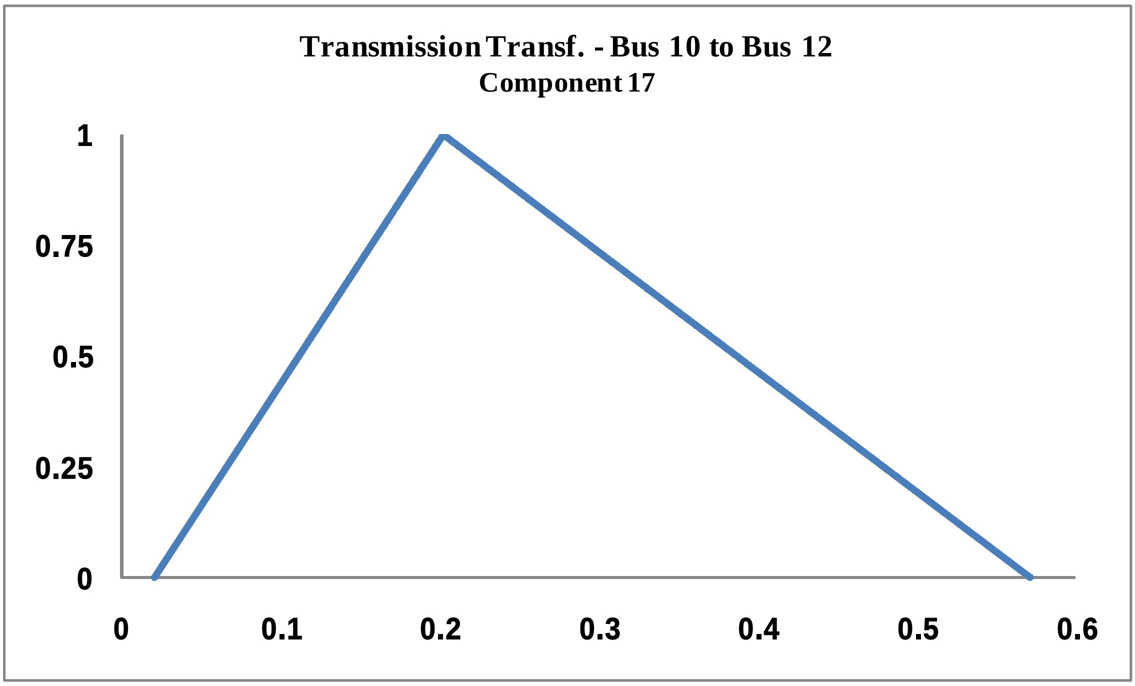

Transmission Line - Bus 8 to Bus 9
Component 12
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

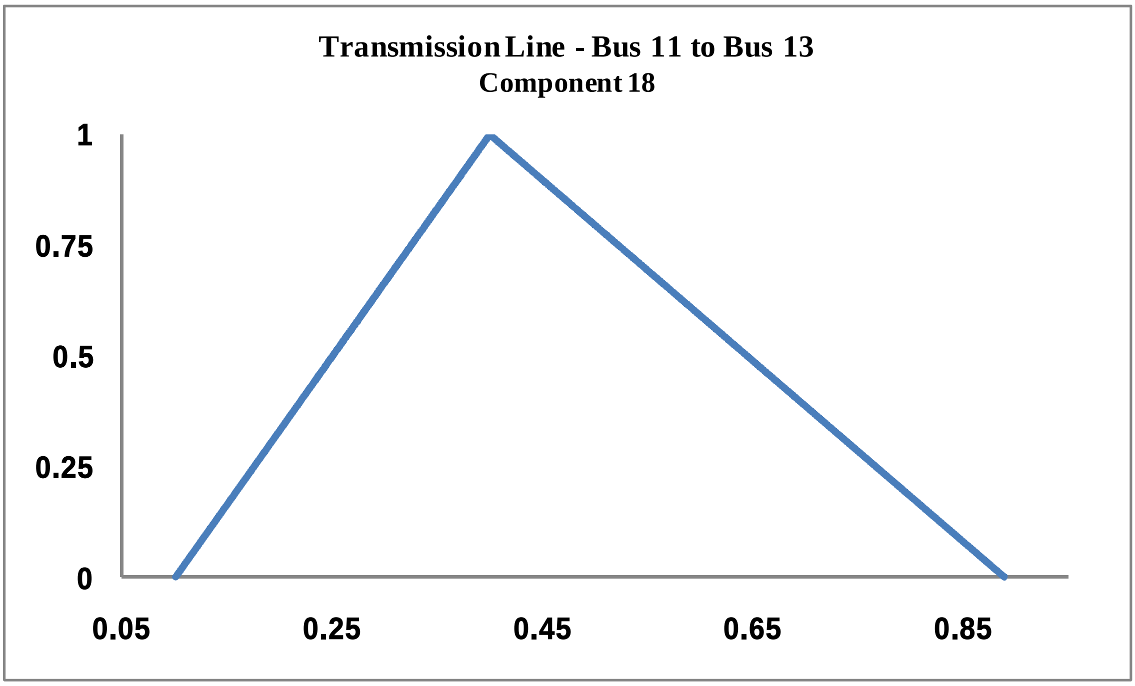

Transmission Line - Bus 8 to Bus 10
Component 13
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

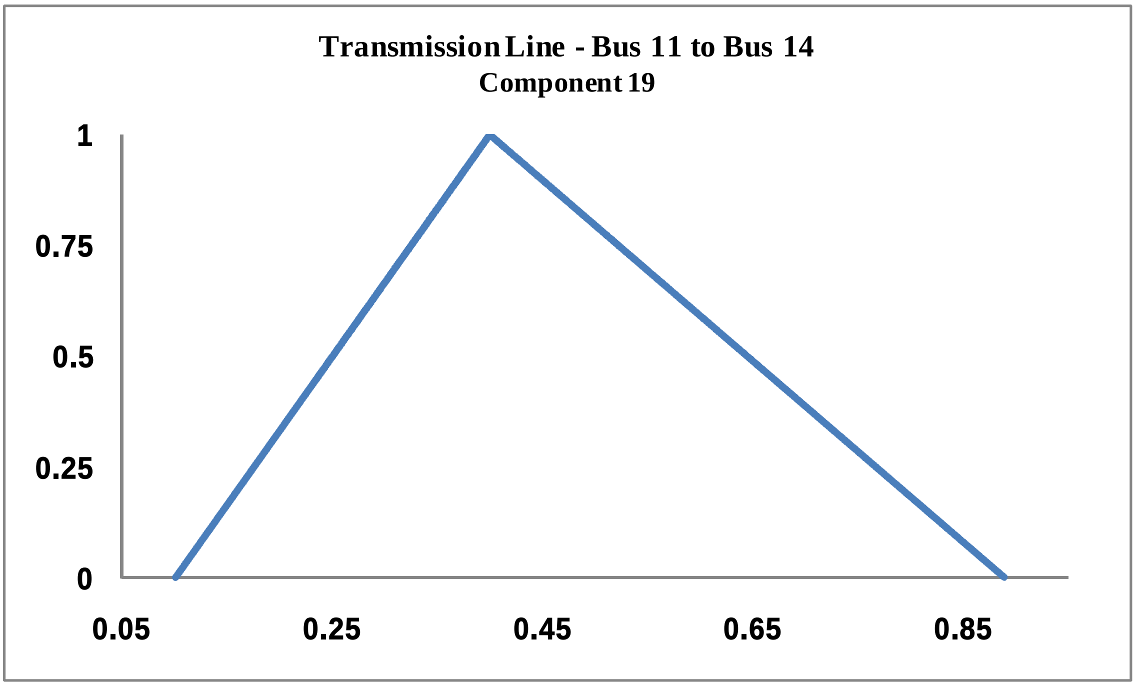

Transmission Transf. - Bus 9 to Bus 11
Component 14
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6

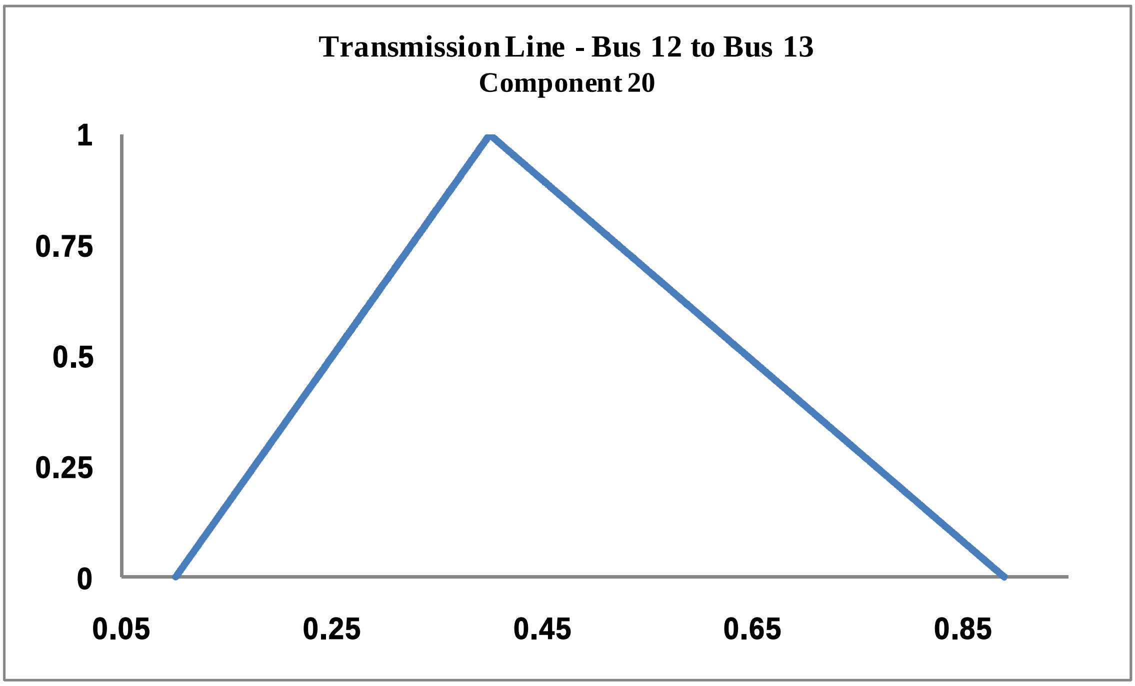

Transmission Transf. - Bus 9 to Bus 12
Component 15
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6

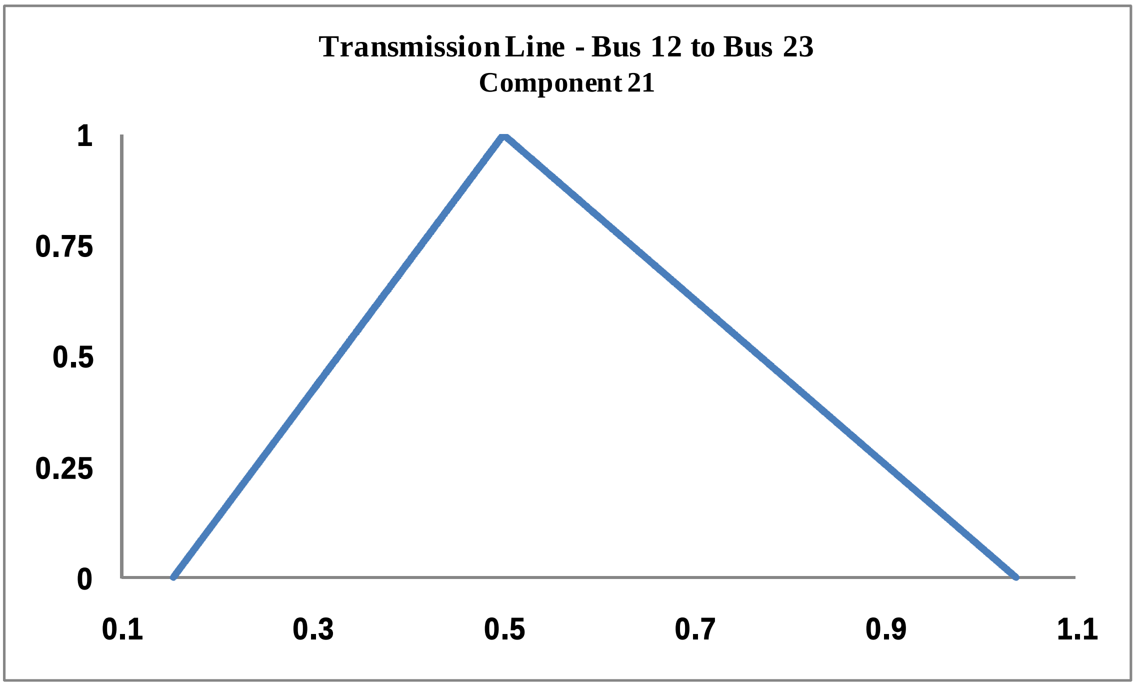

Transmission Transf. - Bus 10 to Bus 11
Component 16
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6

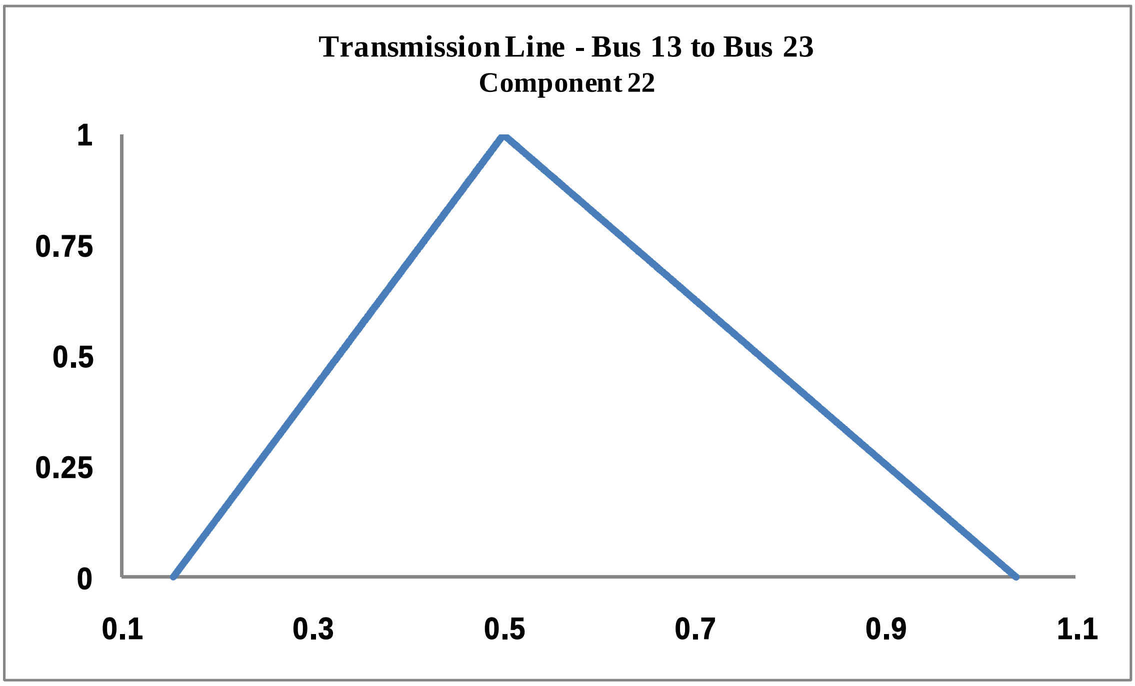

Transmission Transf. - Bus 10 to Bus 12
Component 17
1
0.75
0.5
0.25
0
0
0.1
0.2
0.3
0.4
0.5
0.6

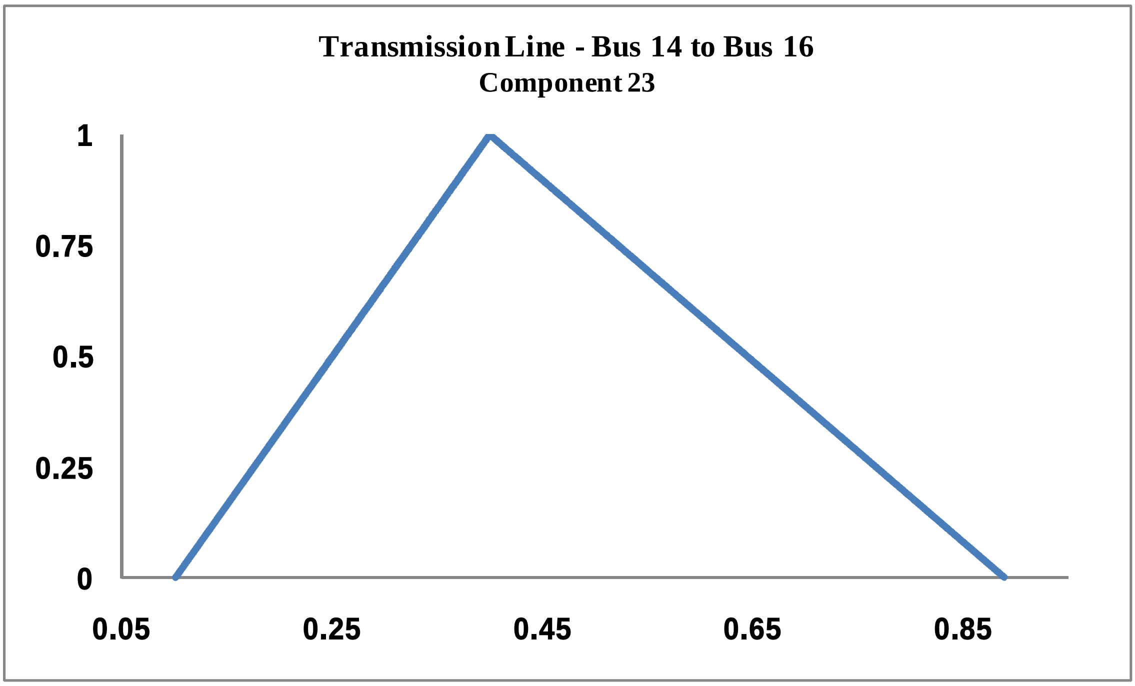

Transmission Line - Bus 11 to Bus 13
Component 18
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

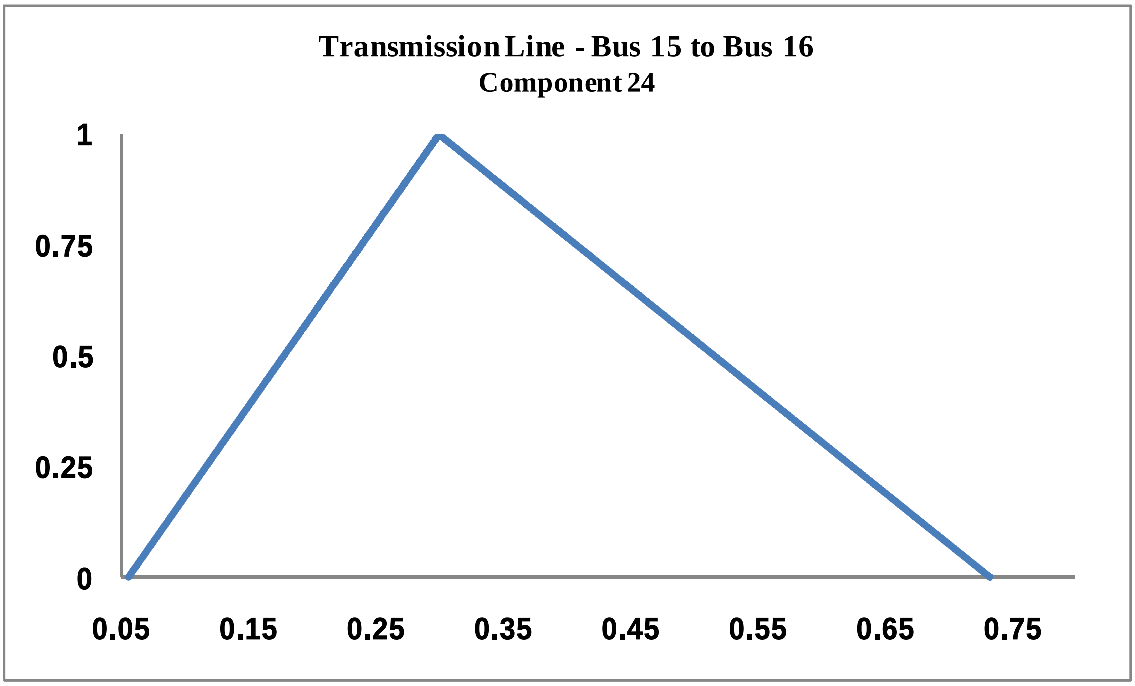

Transmission Line - Bus 11 to Bus 14
Component 19
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

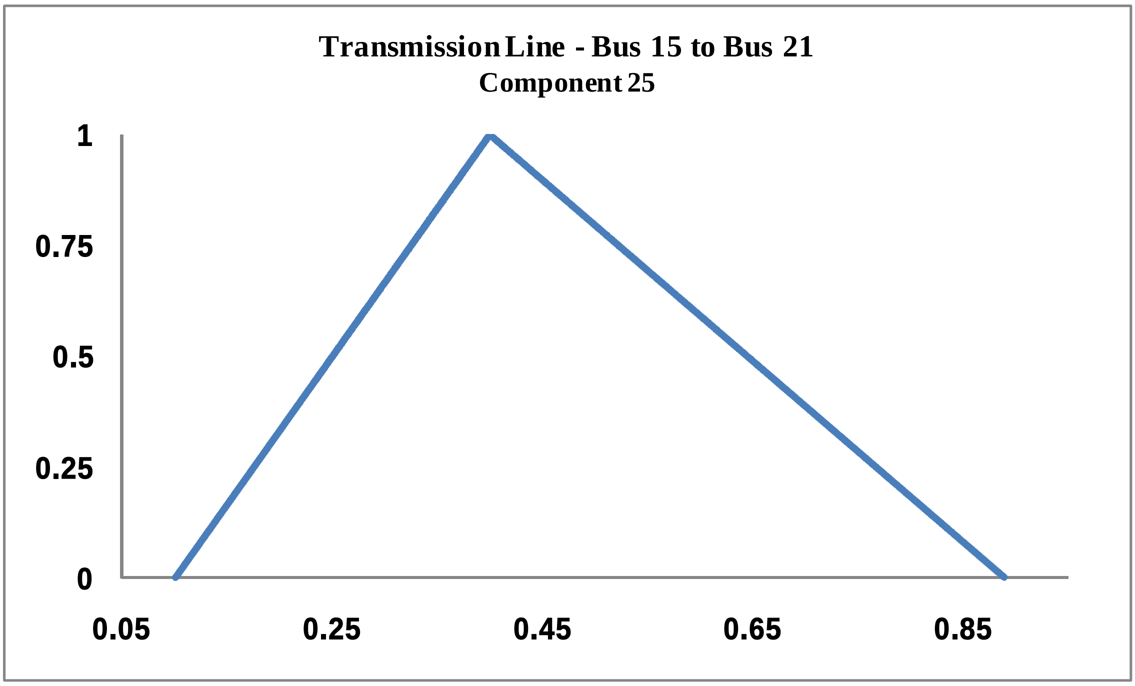

Transmission Line - Bus 12 to Bus 13
Component 20
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

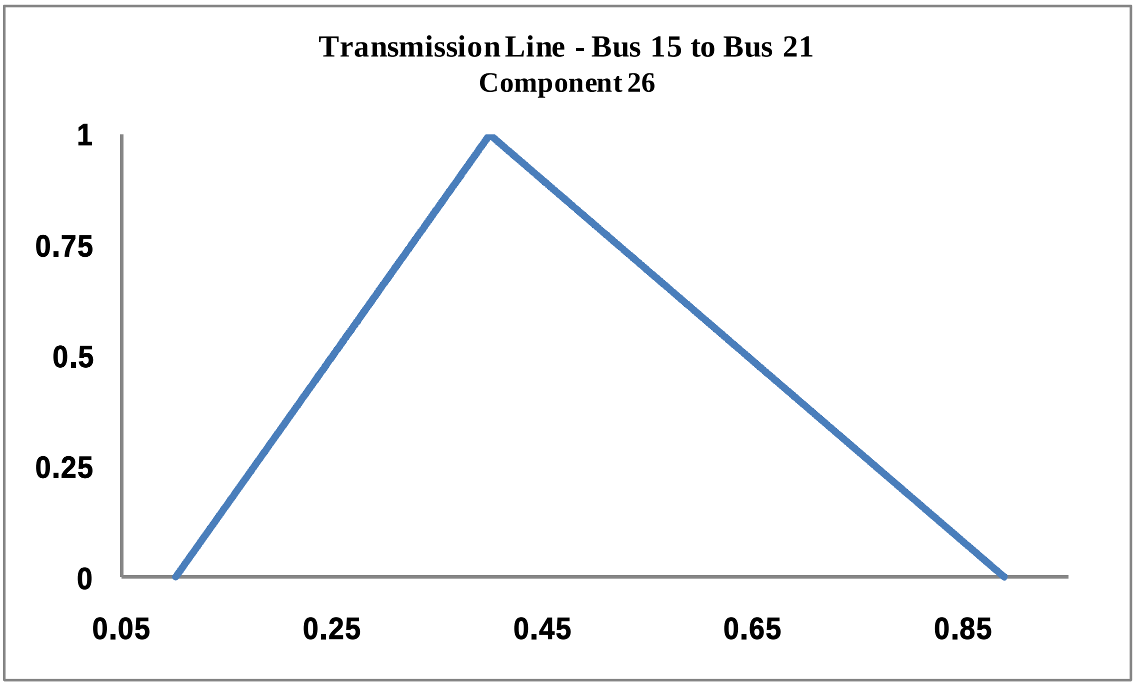

Transmission Line - Bus 12 to Bus 23
Component 21
1
0.75
0.5
0.25
0
0.1
0.3
0.5
0.7
0.9
1.1

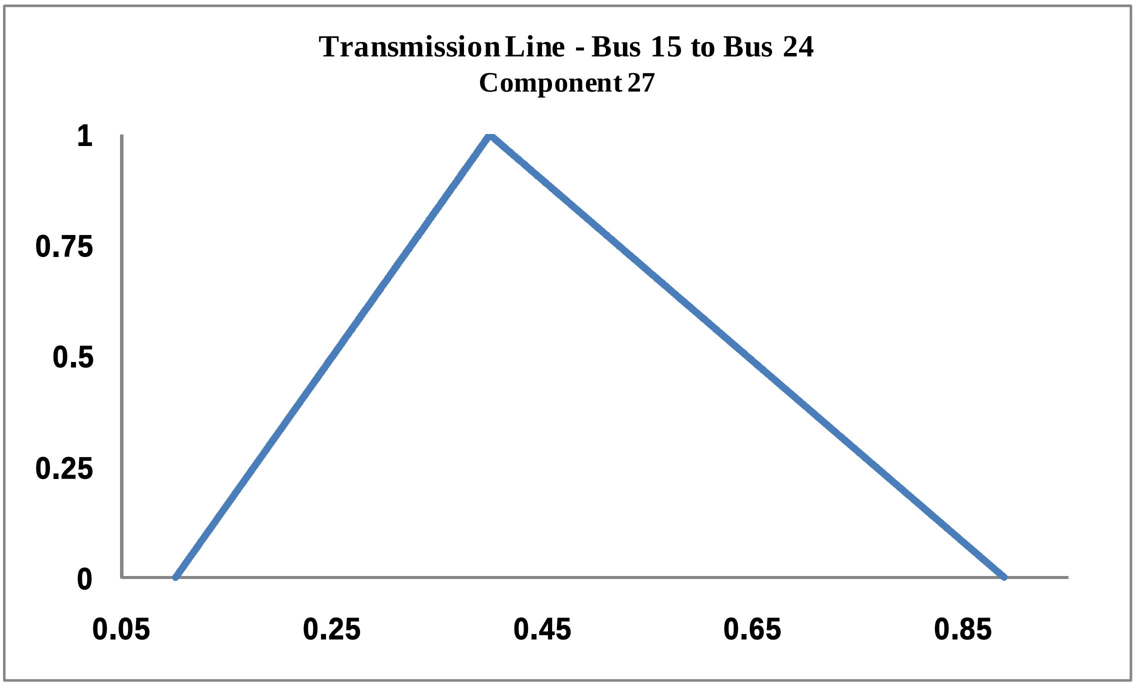

Transmission Line - Bus 13 to Bus 23
Component 22
1
0.75
0.5
0.25
0
0.1
0.3
0.5
0.7
0.9
1.1

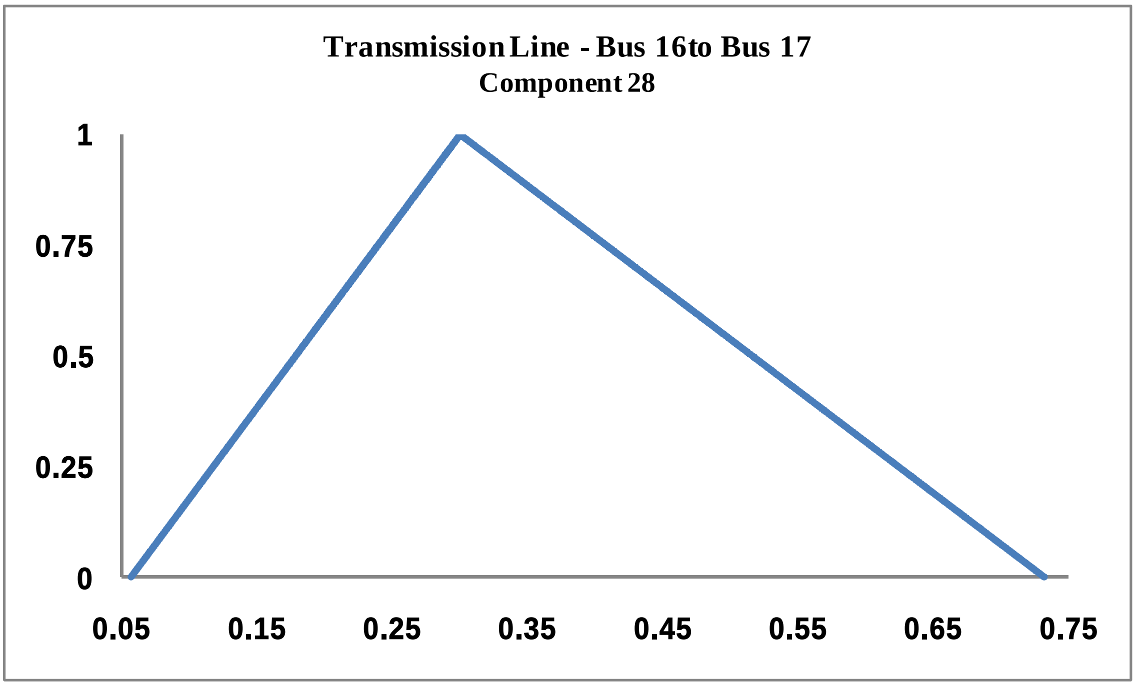

Transmission Line - Bus 14 to Bus 16
Component 23
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

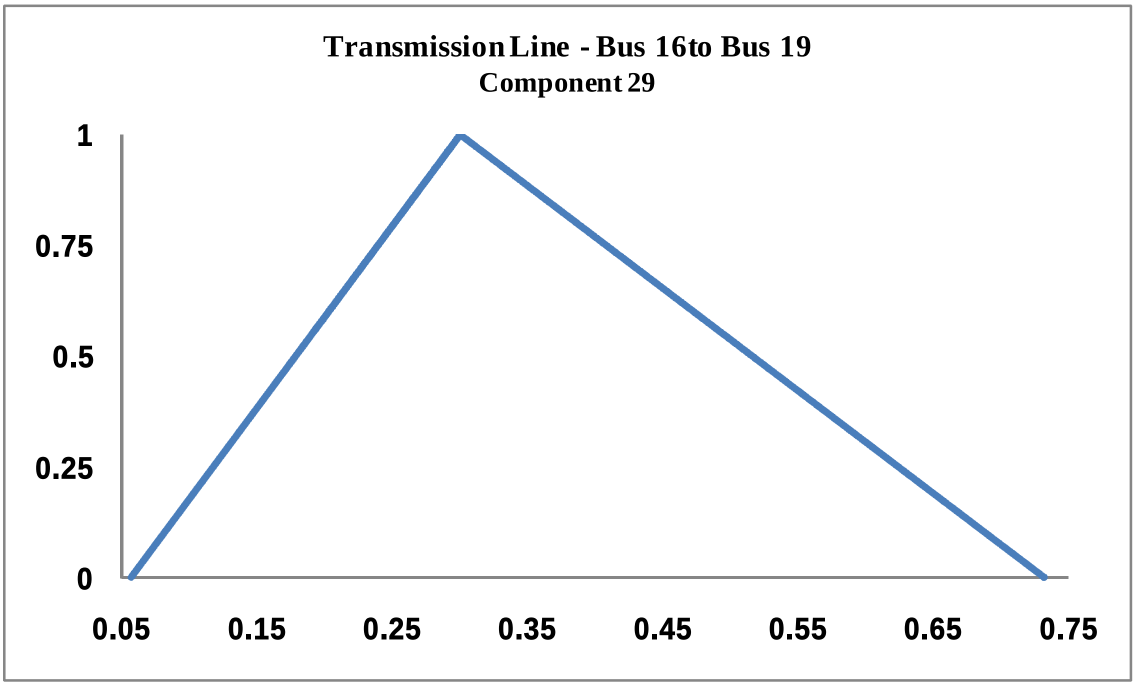

Transmission Line - Bus 15 to Bus 16
Component 24
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

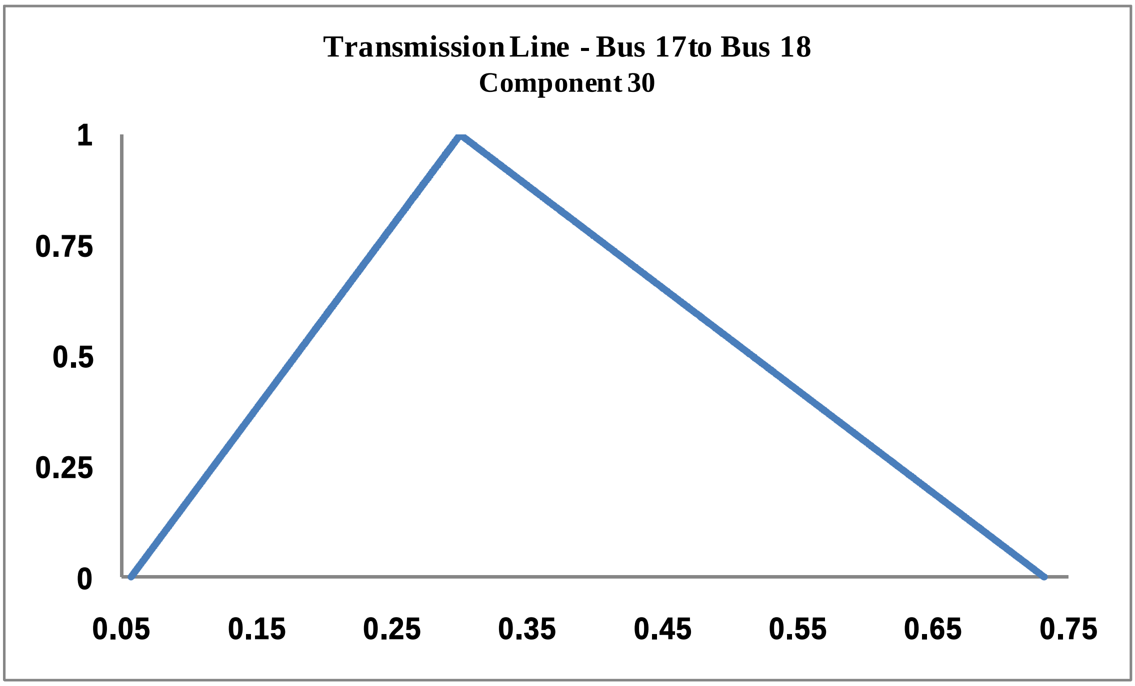

Transmission Line - Bus 15 to Bus 21
Component 25
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

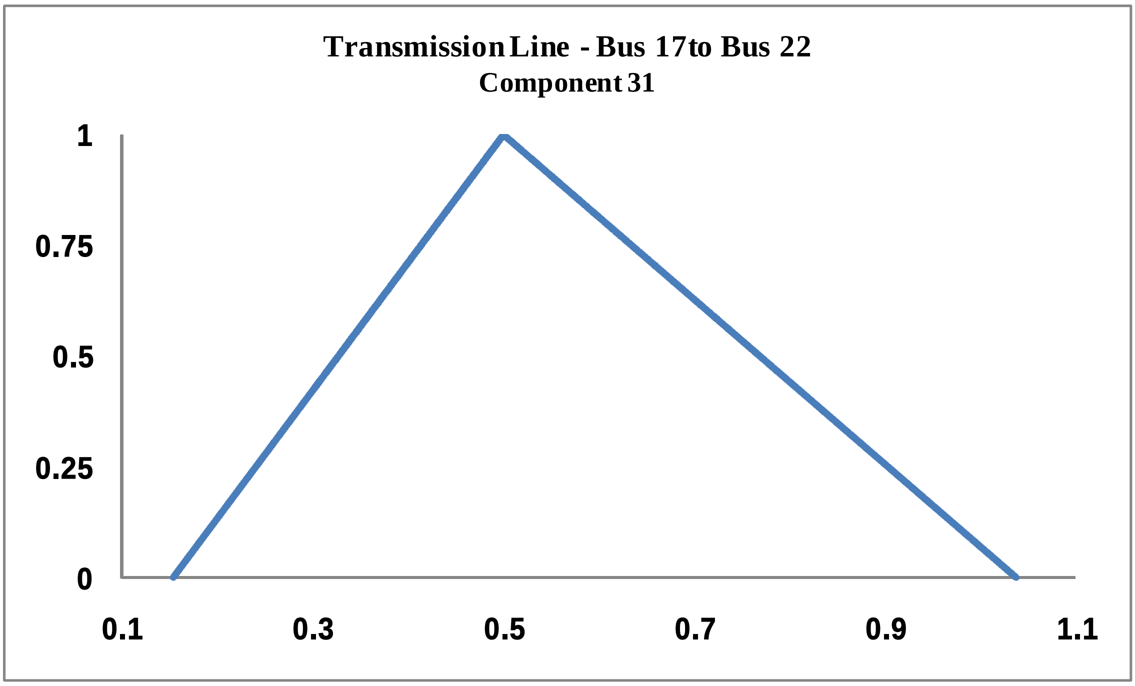

Transmission Line - Bus 15 to Bus 21
Component 26
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

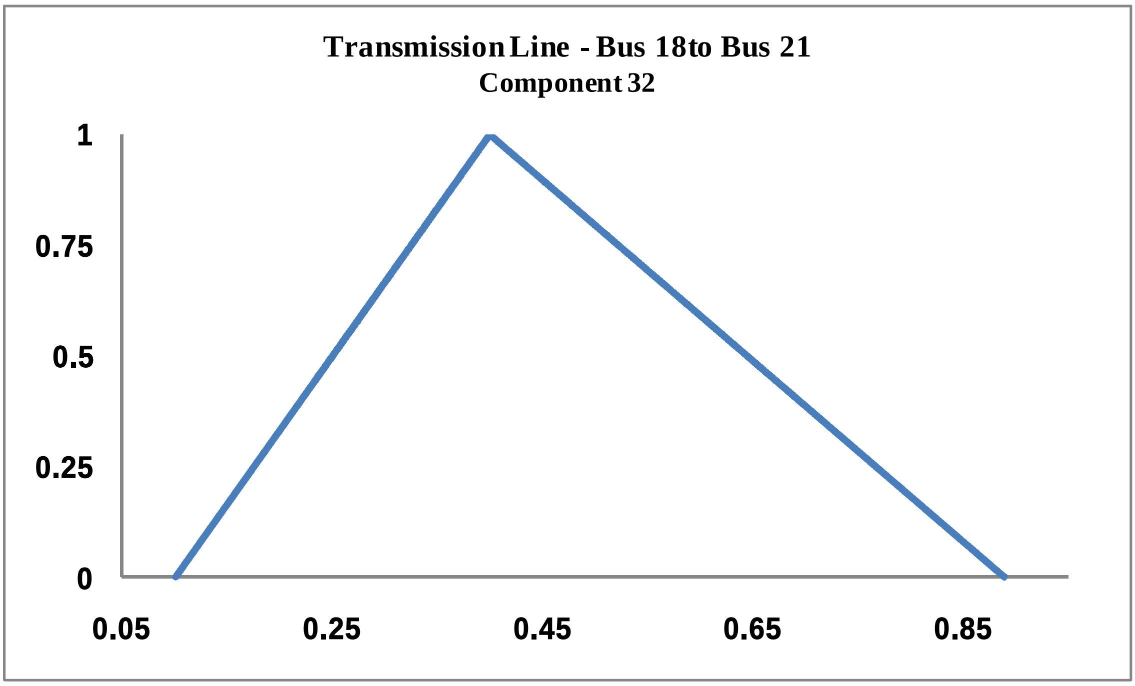

Transmission Line - Bus 15 to Bus 24
Component 27
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

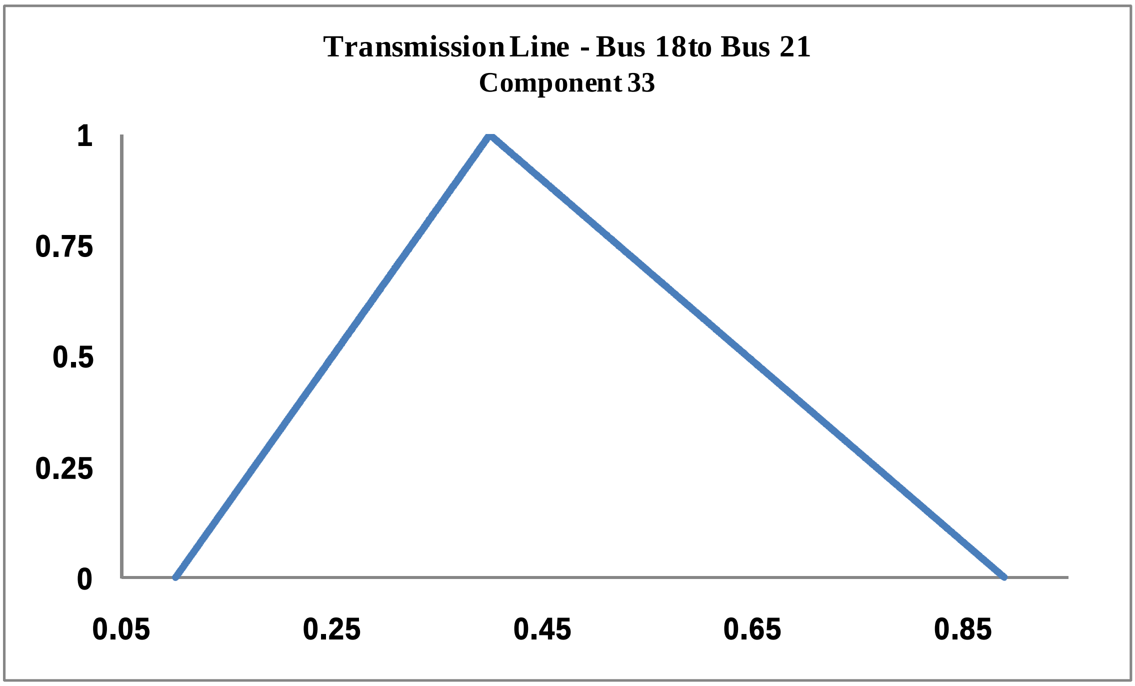

Transmission Line - Bus 16to Bus 17
Component 28
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

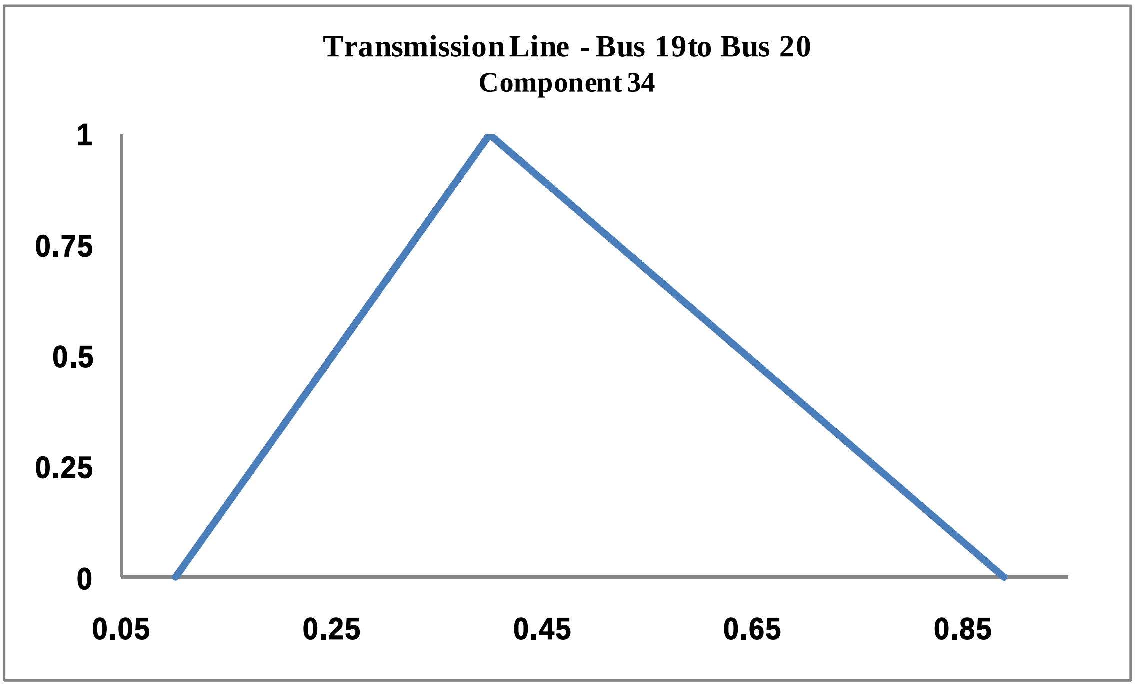

Transmission Line - Bus 16to Bus 19
Component 29
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

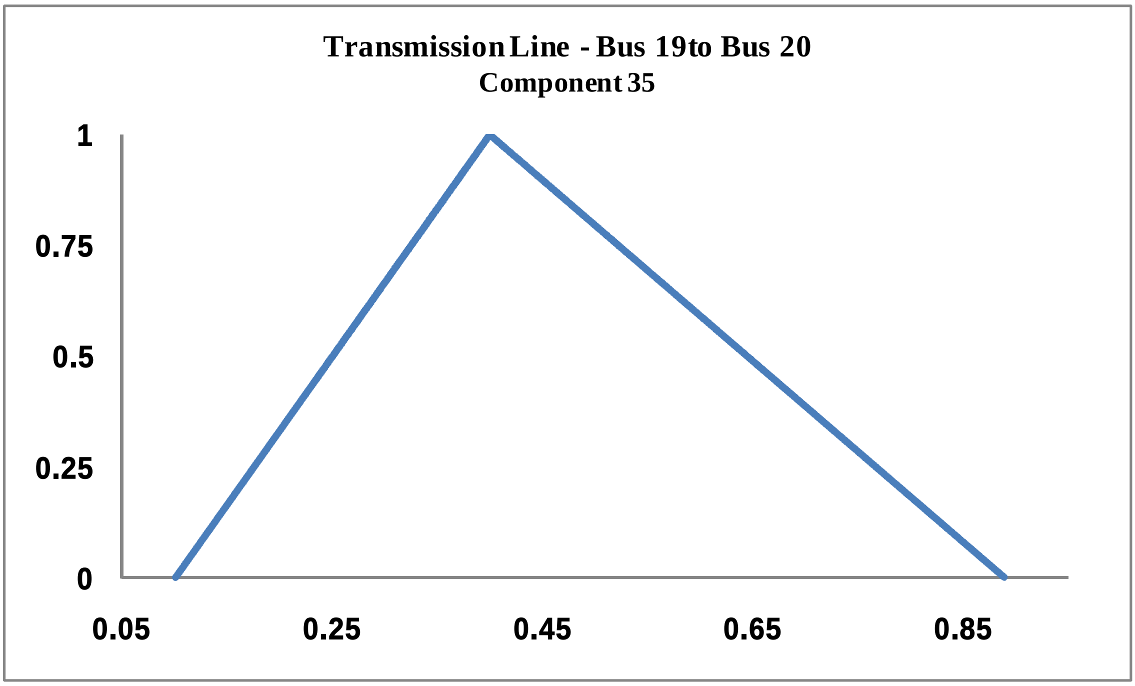

Transmission Line - Bus 17to Bus 18
Component 30
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

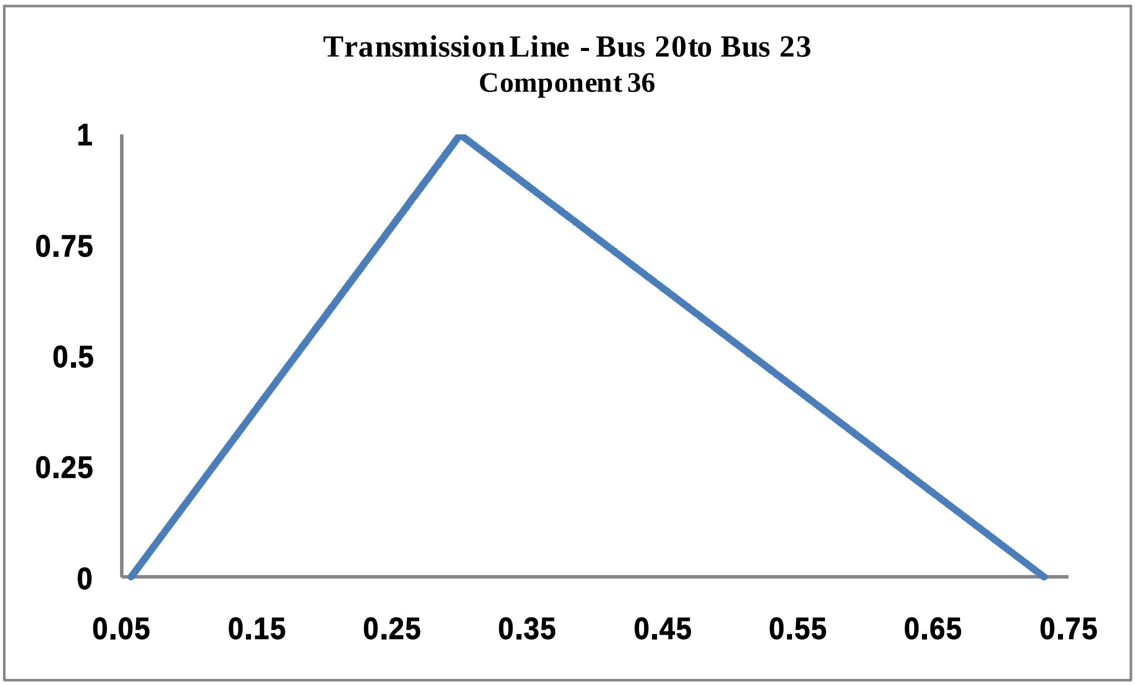

Transmission Line - Bus 17to Bus 22
Component 31
1
0.75
0.5
0.25
0
0.1
0.3
0.5
0.7
0.9
1.1

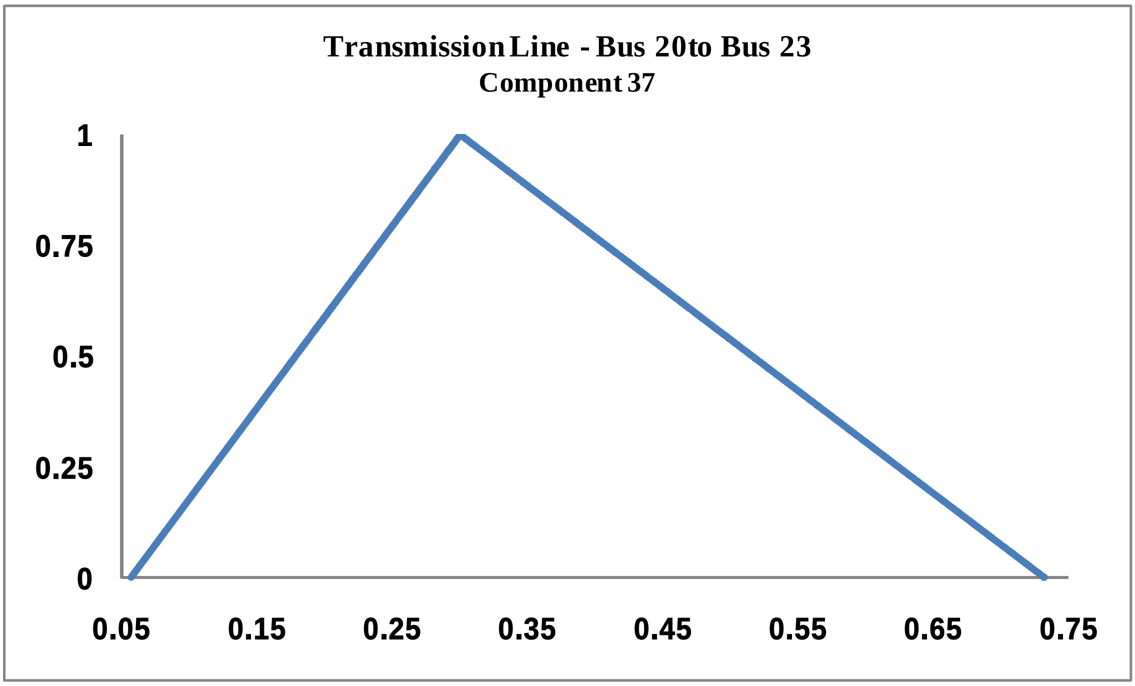

Transmission Line - Bus 18to Bus 21
Component 32
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

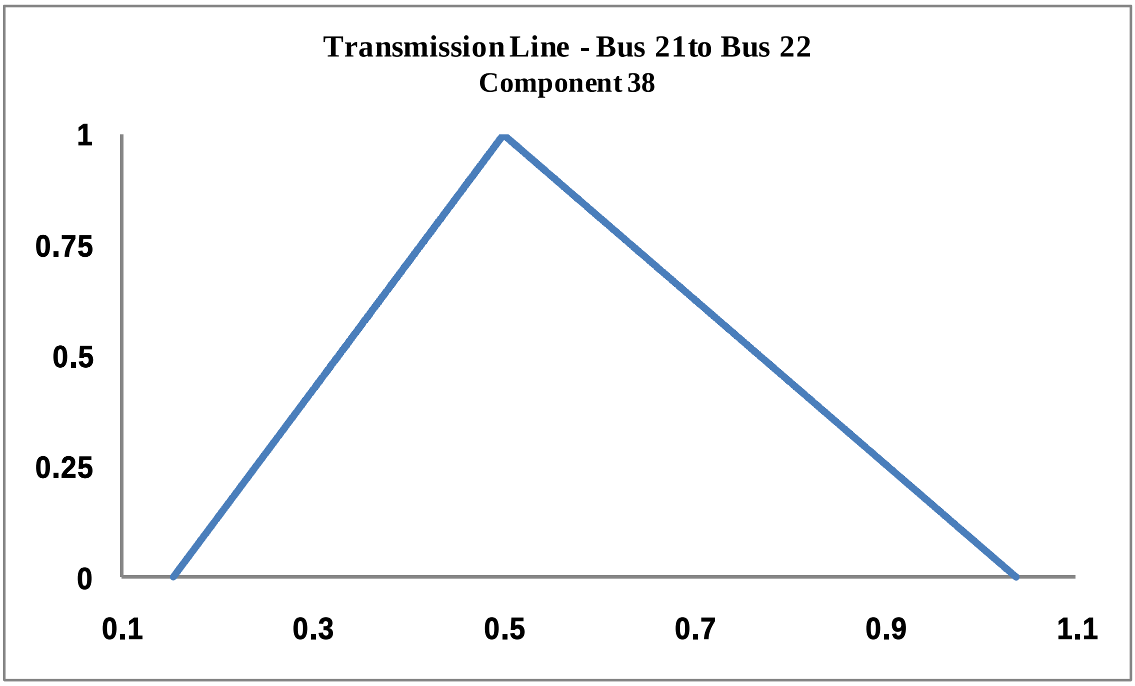

Transmission Line - Bus 18to Bus 21
Component 33
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

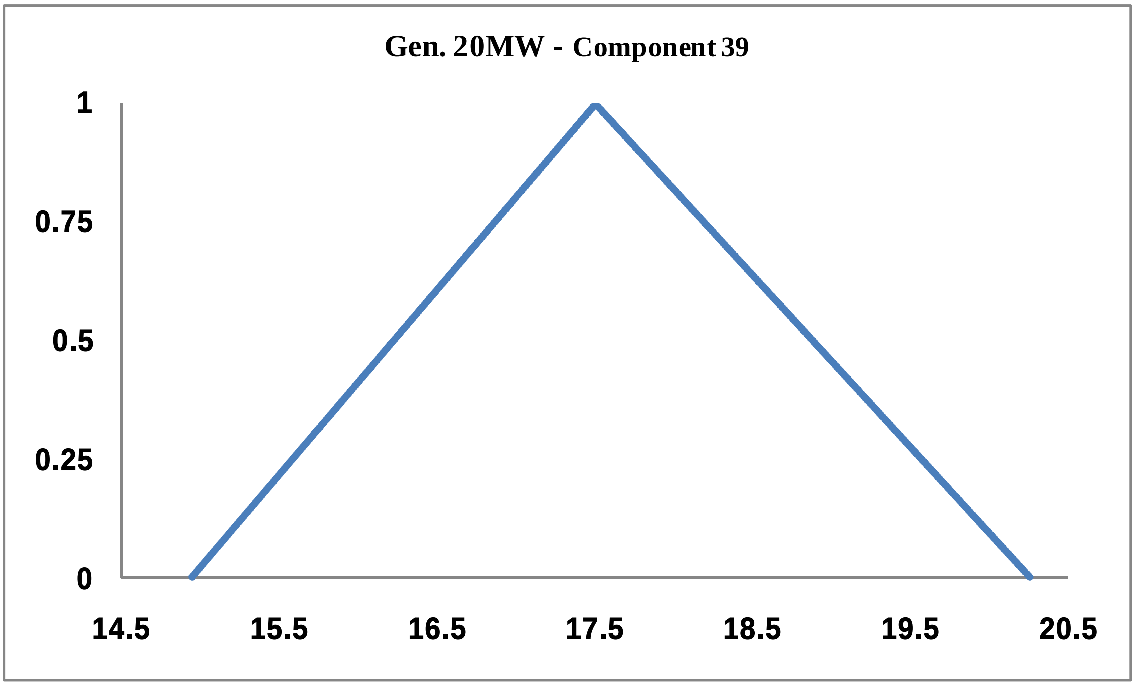

Transmission Line - Bus 19to Bus 20
Component 34
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

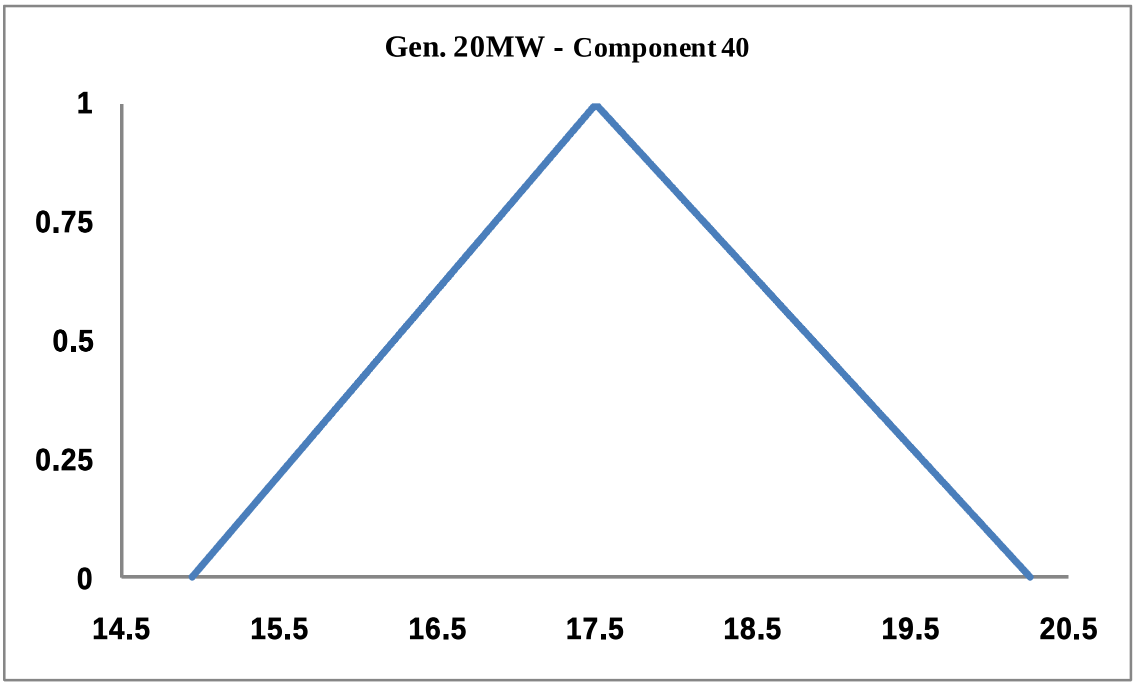

Transmission Line - Bus 19to Bus 20
Component 35
1
0.75
0.5
0.25
0
0.05
0.25
0.45
0.65
0.85

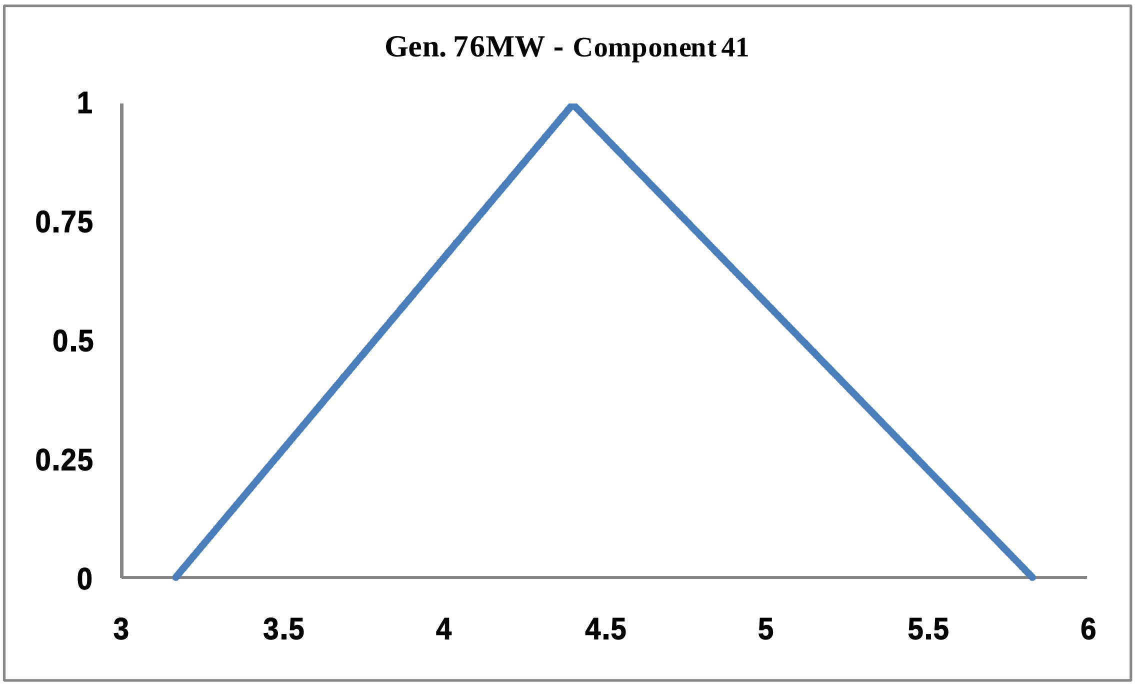

Transmission Line - Bus 20to Bus 23
Component 36
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

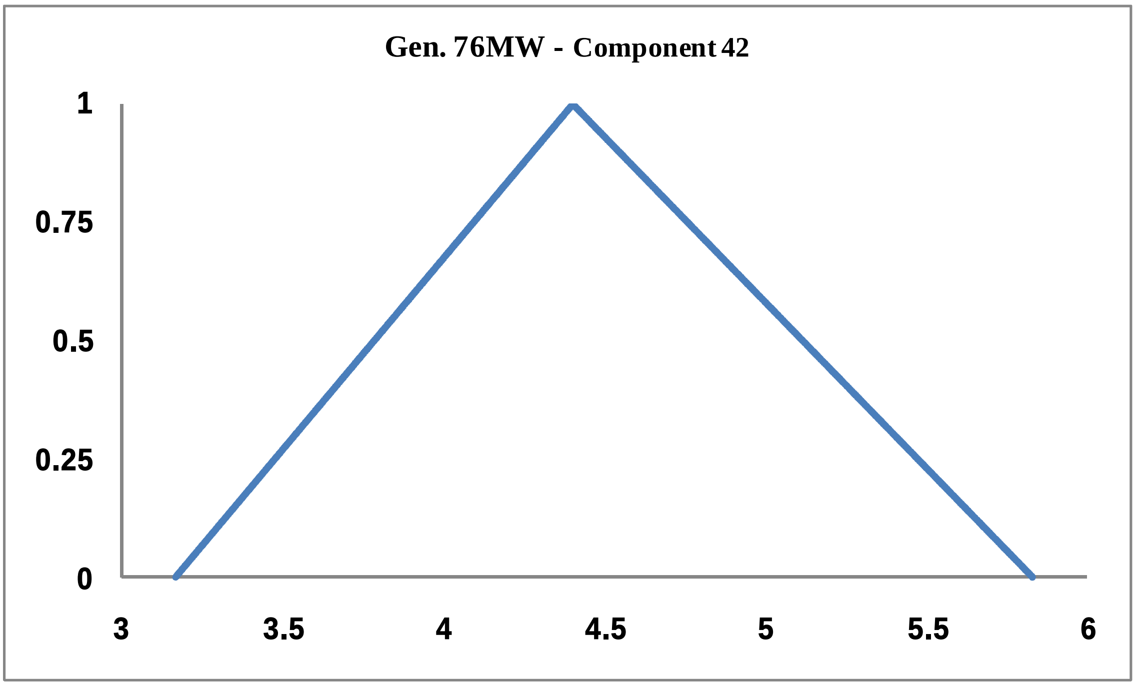

Transmission Line - Bus 20to Bus 23
Component 37
1
0.75
0.5
0.25
0
0.05
0.15
0.25
0.35
0.45
0.55
0.65
0.75

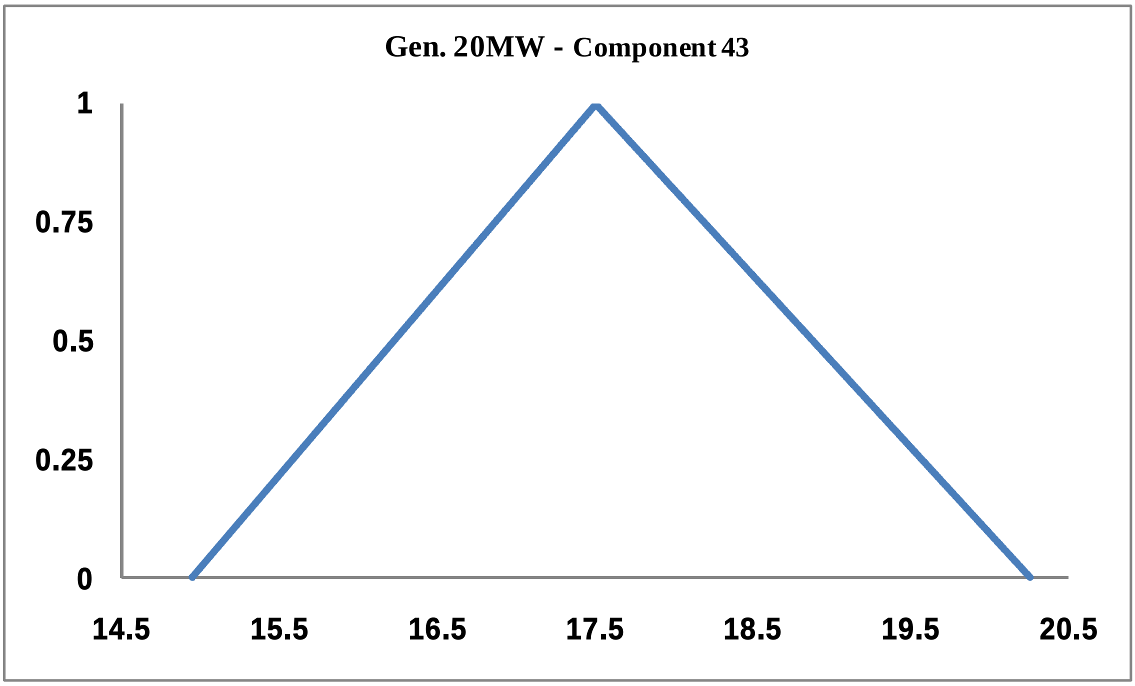

Transmission Line - Bus 21to Bus 22
Component 38
1
0.75
0.5
0.25
0
0.1
0.3
0.5
0.7
0.9
1.1

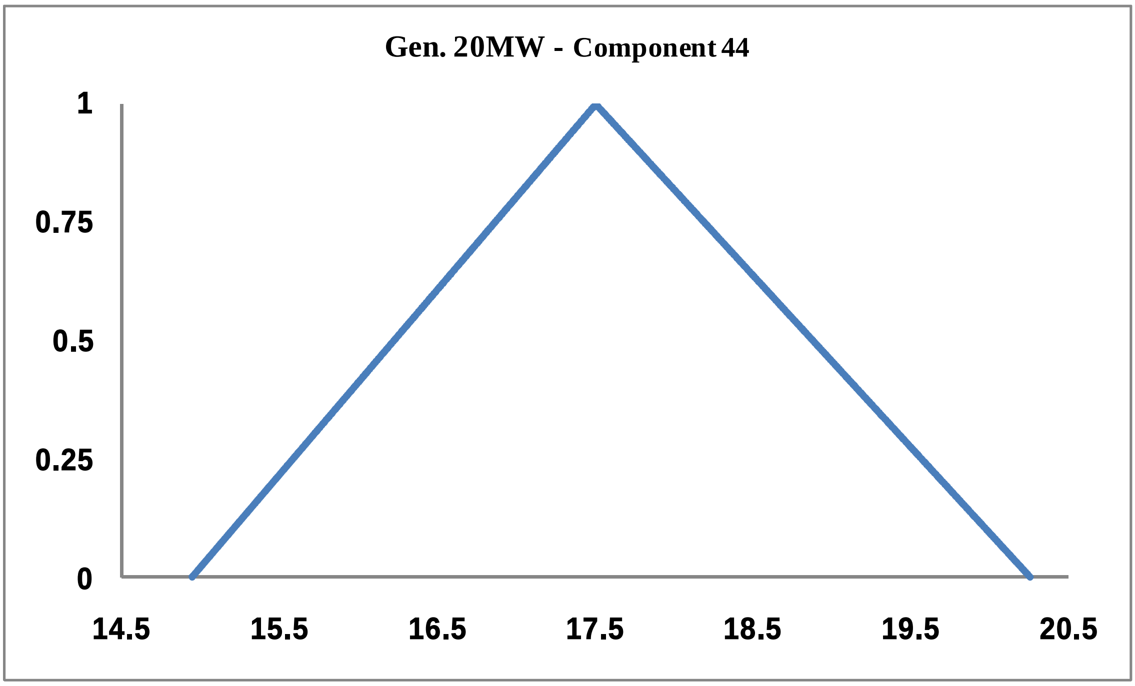

Gen. 20MW - Component 39
1
0.75
0.5
0.25
0
14.5
15.5
16.5
17.5
18.5
19.5
20.5

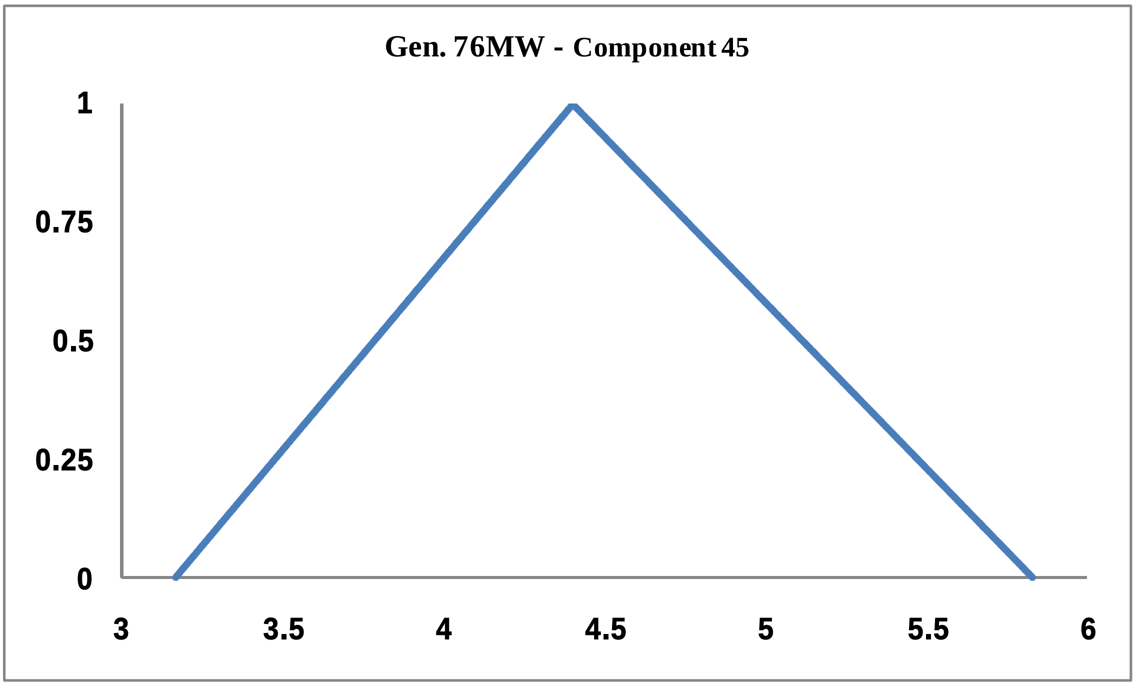

Gen. 20MW - Component 40
1
0.75
0.5
0.25
0
14.5
15.5
16.5
17.5
18.5
19.5
20.5

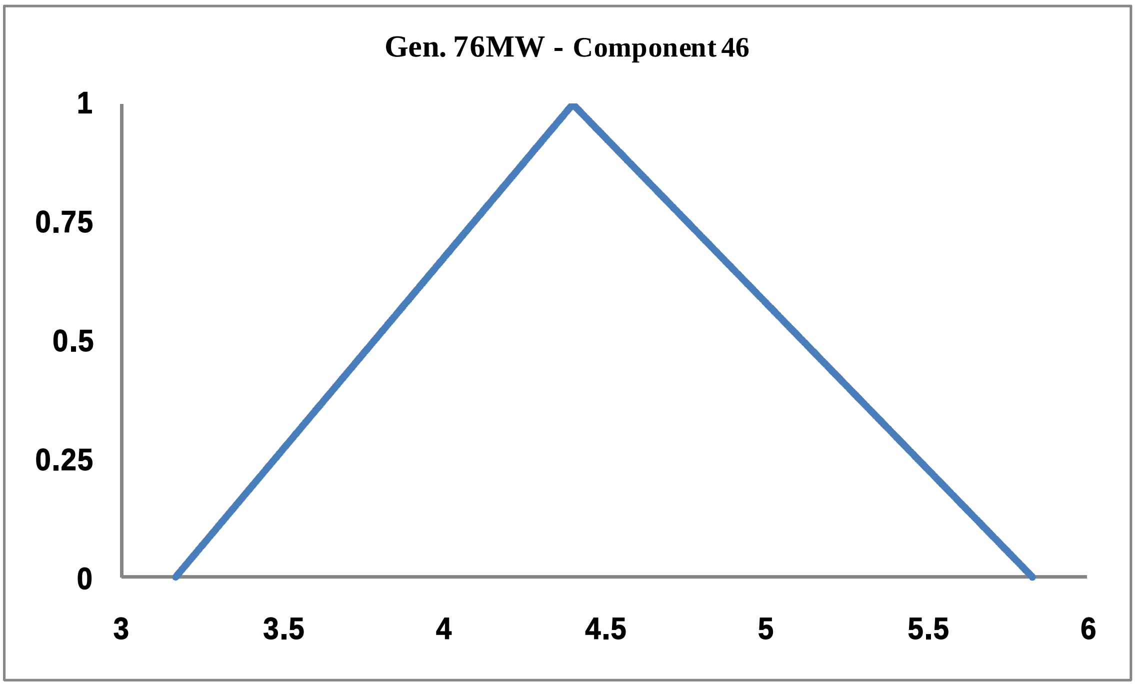

Gen. 76MW - Component 41
1
0.75
0.5
0.25
0
3
3.5
4
4.5
5
5.5
6

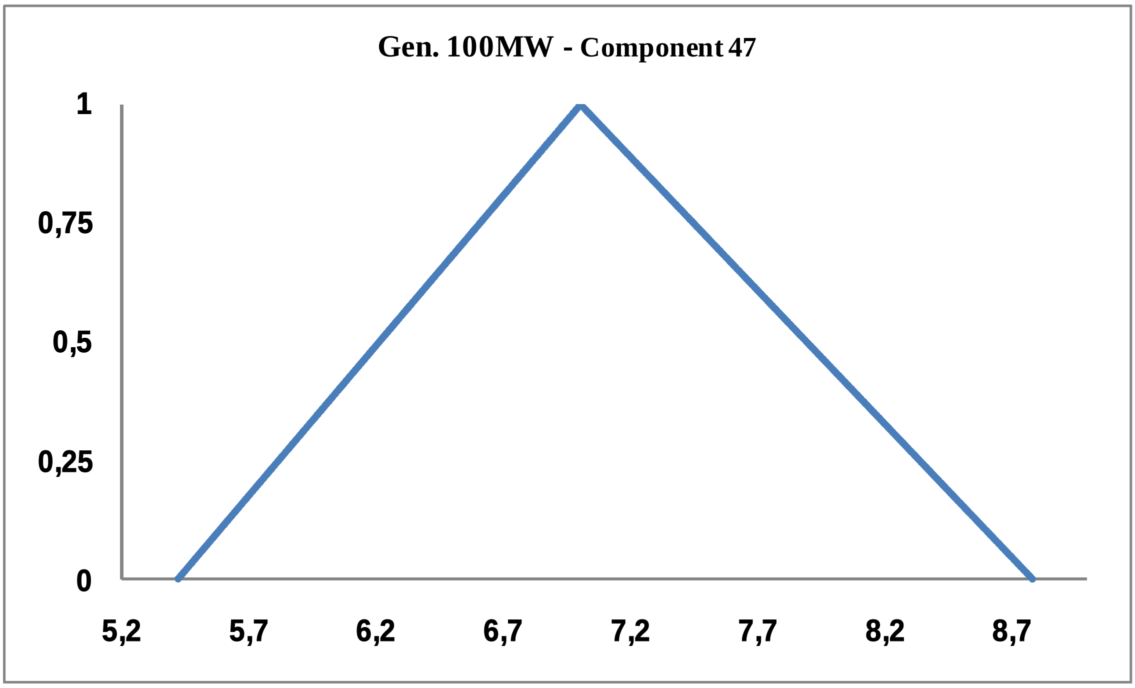

Gen. 76MW - Component 42
1
0.75
0.5
0.25
0
3
3.5
4
4.5
5
5.5
6

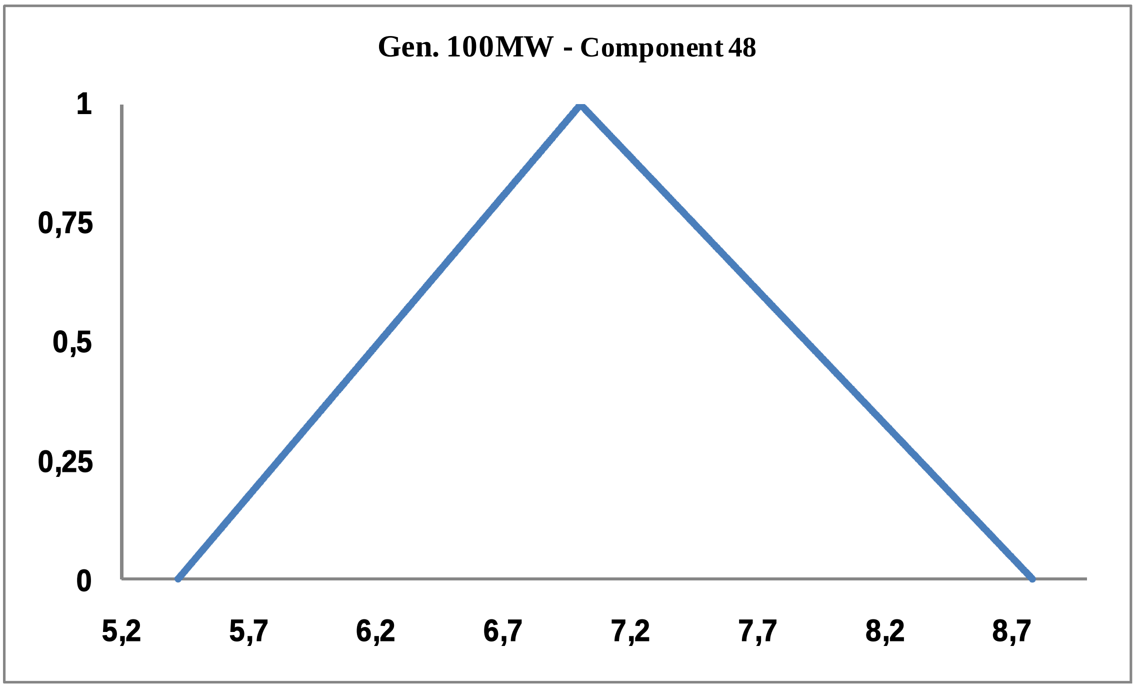

Gen. 20MW - Component 43
1
0.75
0.5
0.25
0
14.5
15.5
16.5
17.5
18.5
19.5
20.5

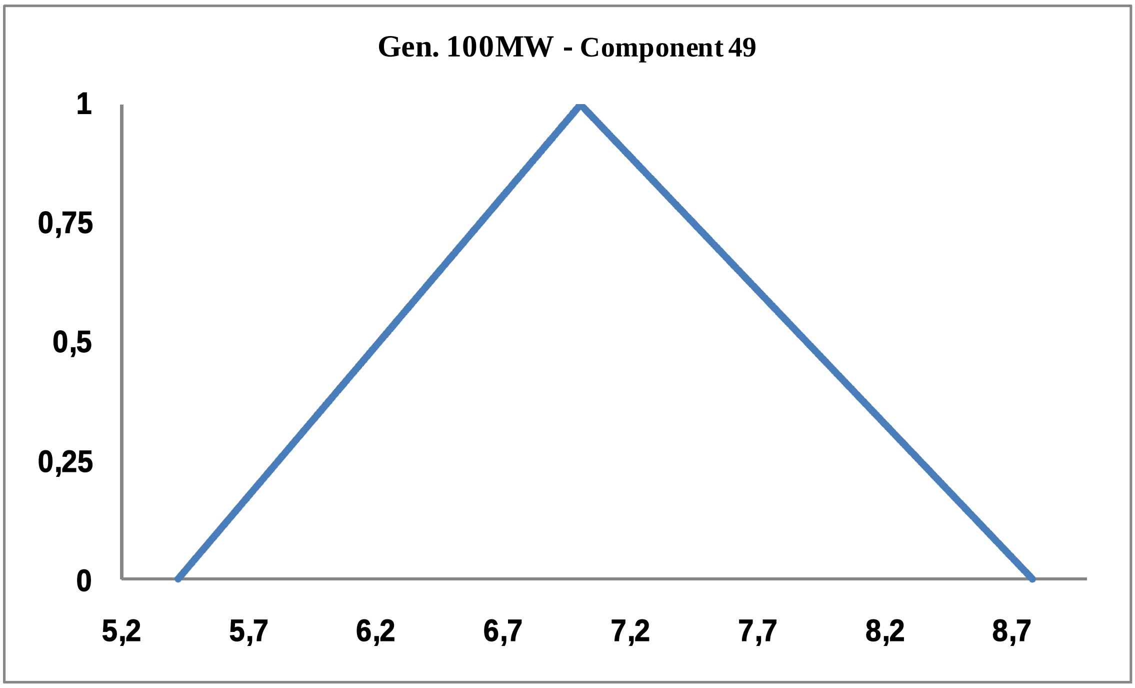

Gen. 20MW - Component 44
1
0.75
0.5
0.25
0
14.5
15.5
16.5
17.5
18.5
19.5
20.5

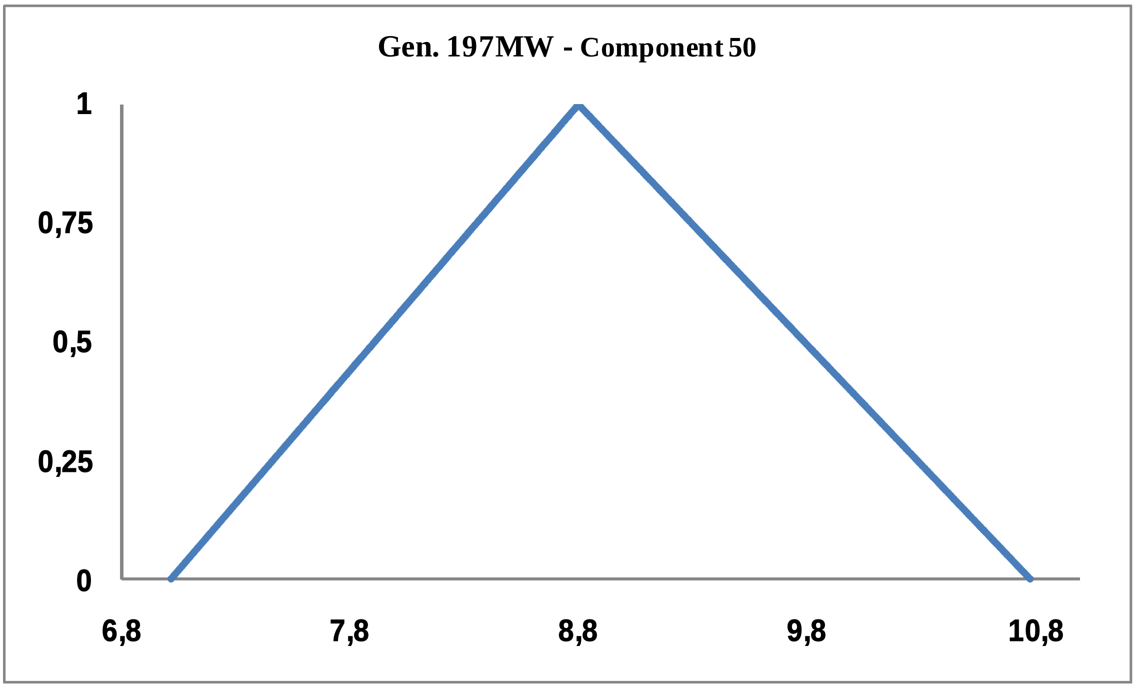

Gen. 76MW - Component 45
1
0.75
0.5
0.25
0
3
3.5
4
4.5
5
5.5
6

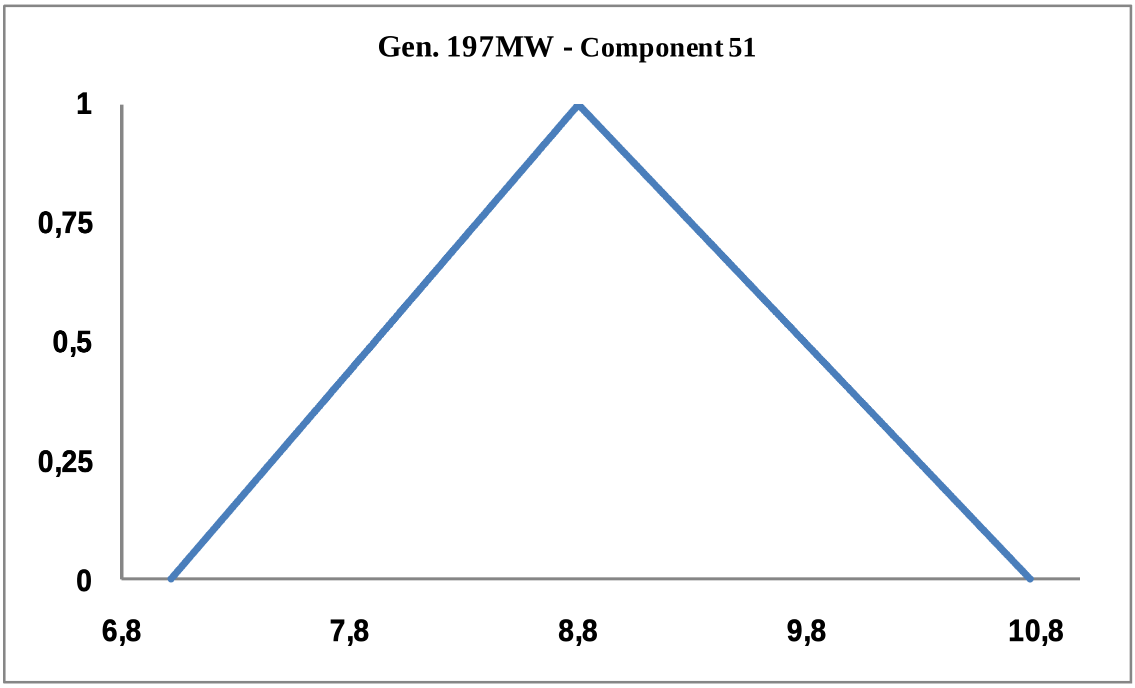

Gen. 76MW - Component 46
1
0.75
0.5
0.25
0
3
3.5
4
4.5
5
5.5
6

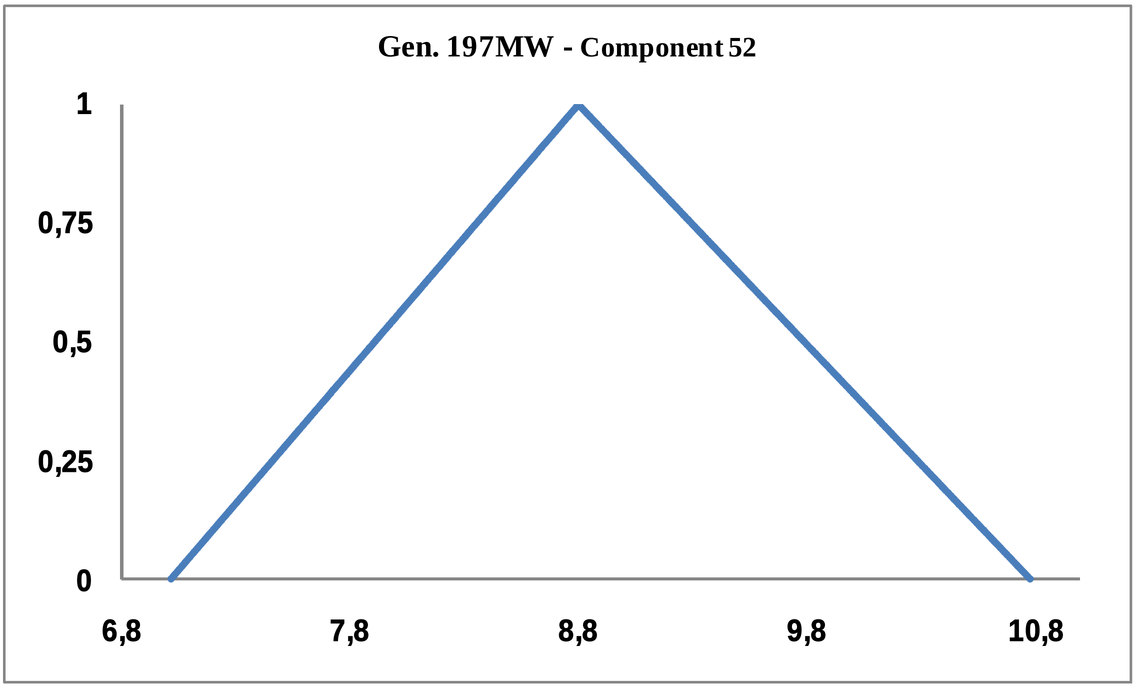

Gen. 100MW - Component 47
1
0,75
0,5
0,25
0
5,2
5,7
6,2
6,7
7,2
7,7
8,2
8,7

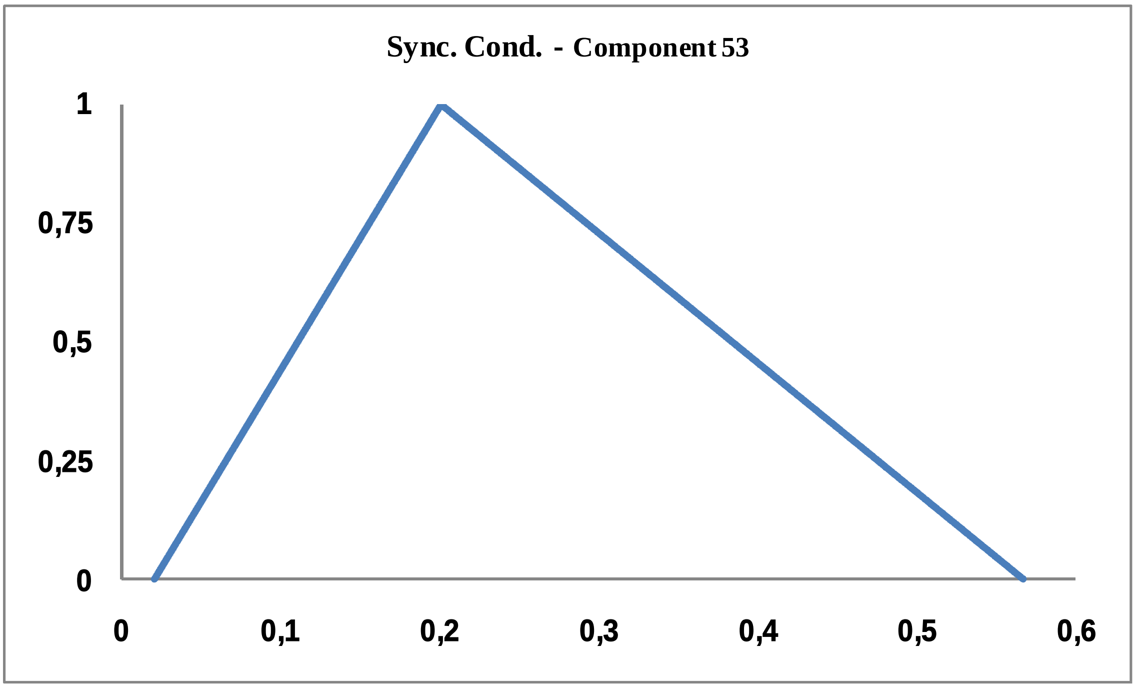

Gen. 100MW - Component 48
1
0,75
0,5
0,25
0
5,2
5,7
6,2
6,7
7,2
7,7
8,2
8,7

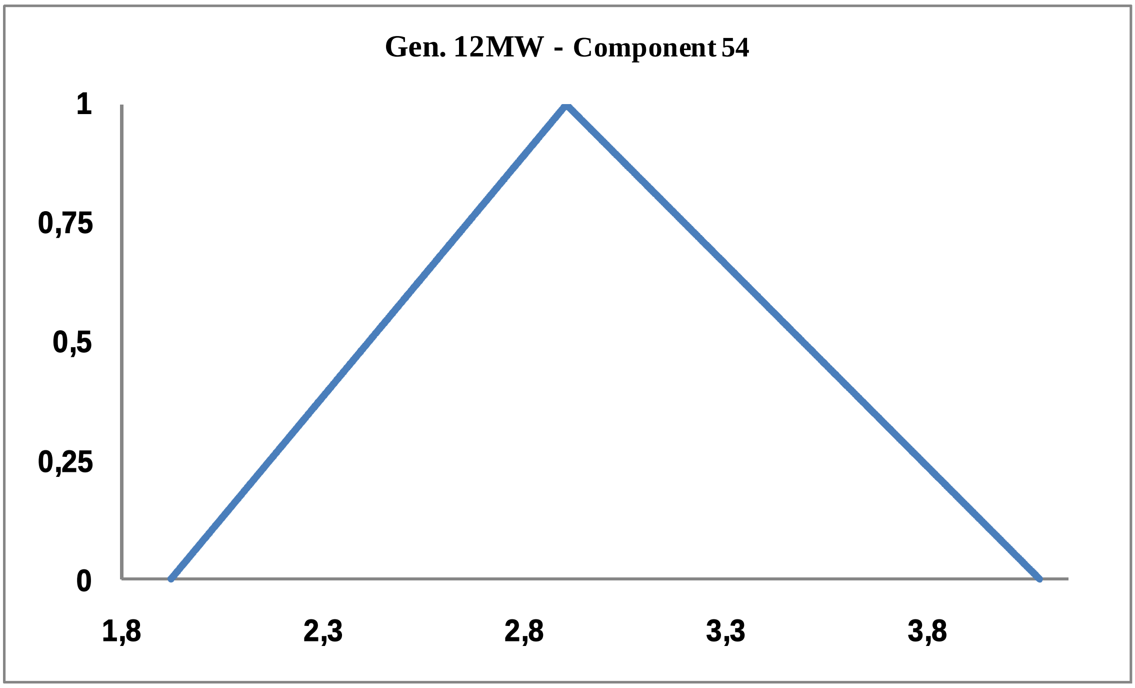

Gen. 100MW - Component 49
1
0,75
0,5
0,25
0
5,2
5,7
6,2
6,7
7,2
7,7
8,2
8,7

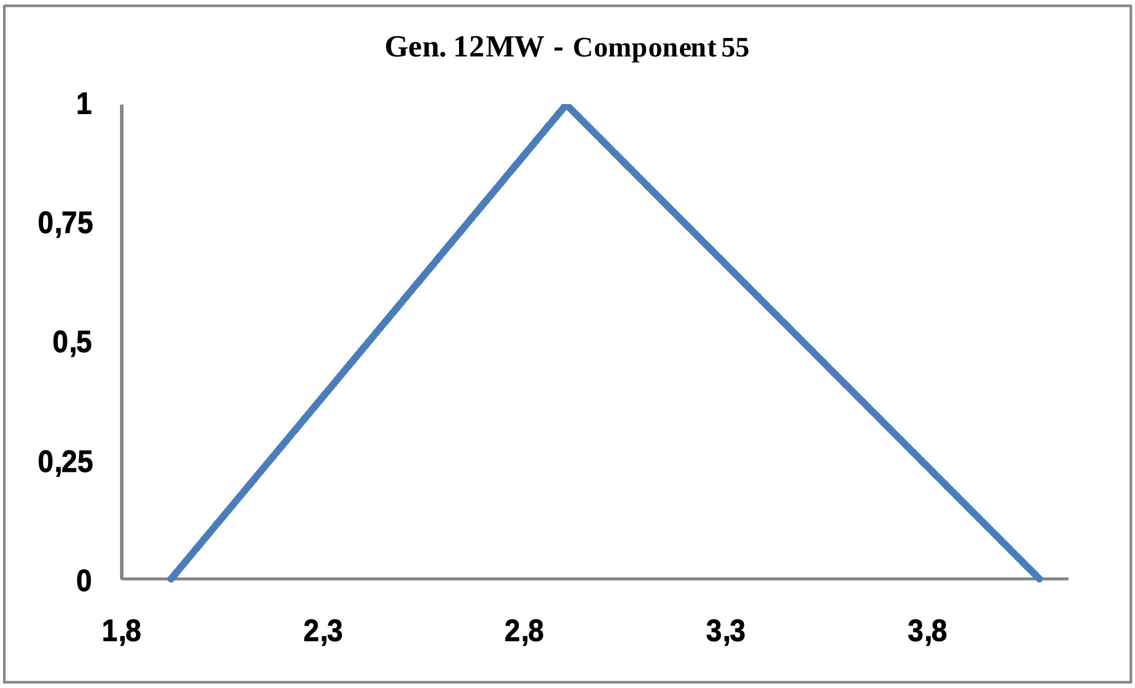

Gen. 197MW - Component 50
1
0,75
0,5
0,25
0
6,8
7,8
8,8
9,8
10,8

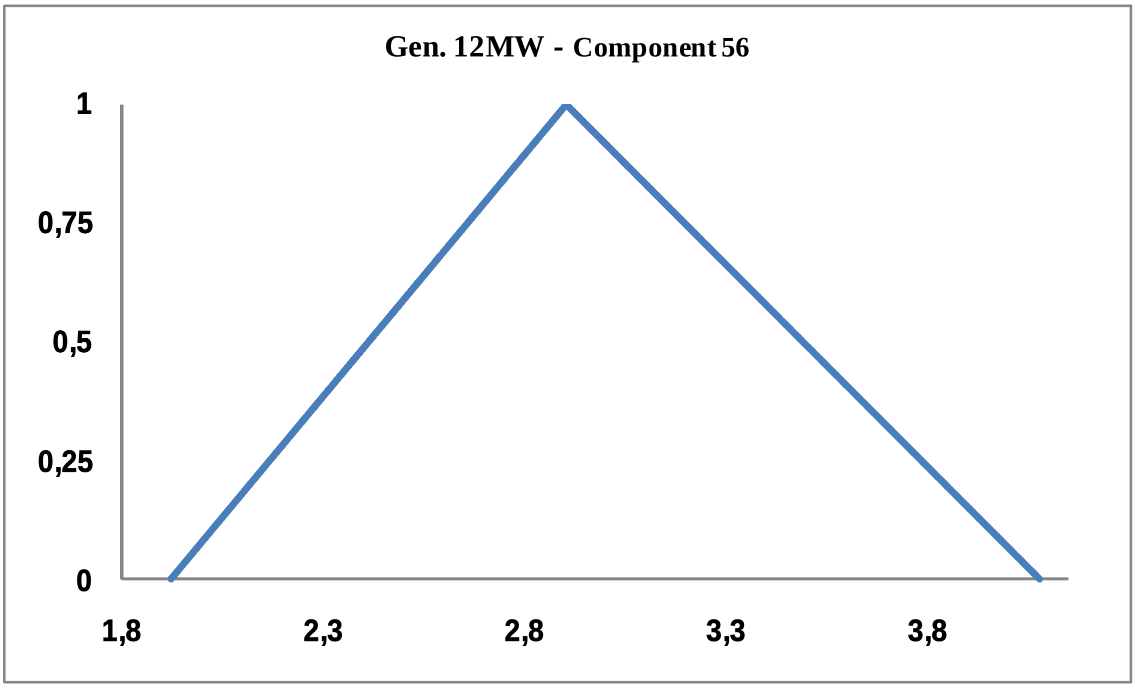

Gen. 197MW - Component 51
1
0,75
0,5
0,25
0
6,8
7,8
8,8
9,8
10,8

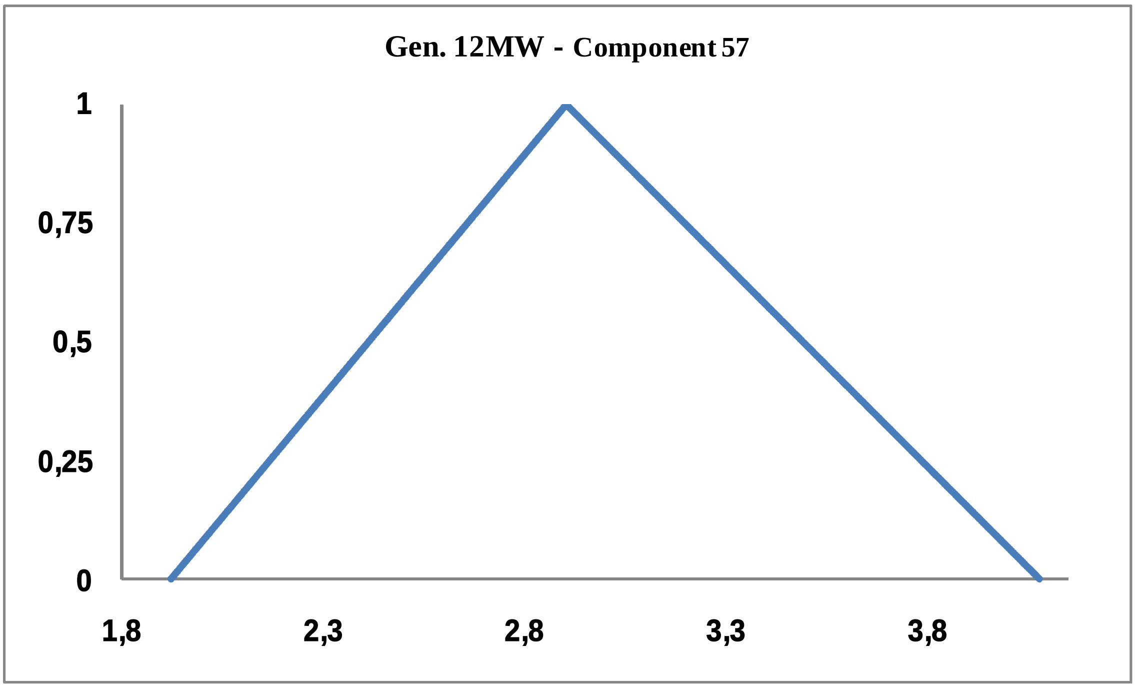

Gen. 197MW - Component 52
1
0,75
0,5
0,25
0
6,8
7,8
8,8
9,8
10,8

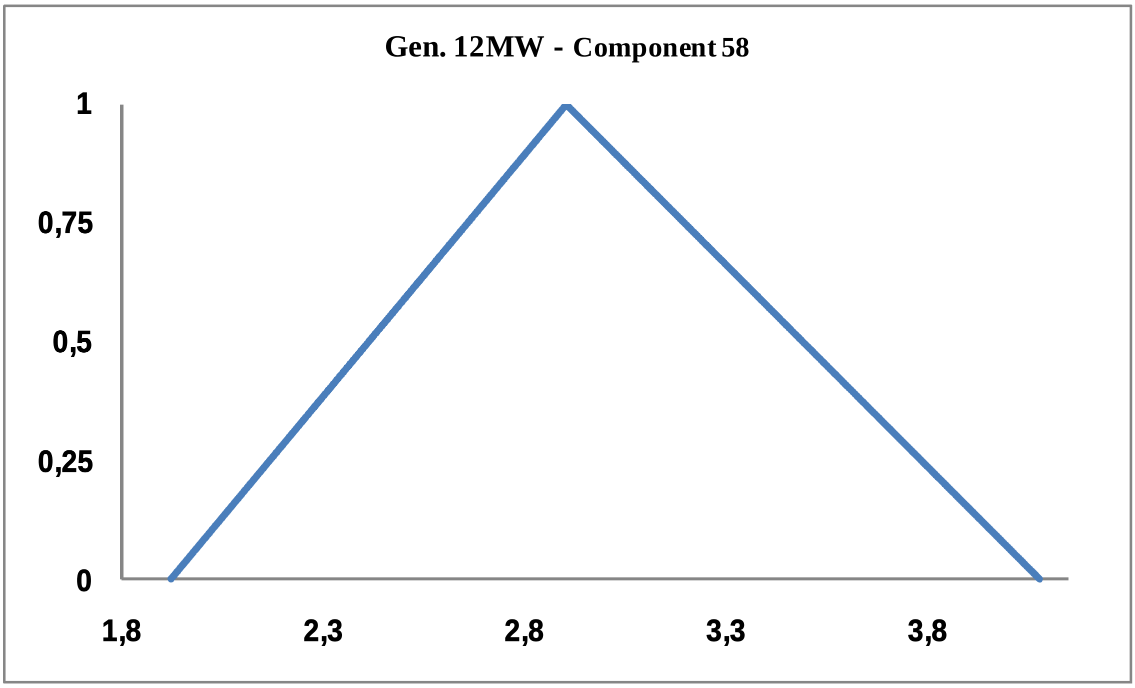

Sync. Cond. - Component 53
1
0,75
0,5
0,25
0
0
0,1
0,2
0,3
0,4
0,5
0,6

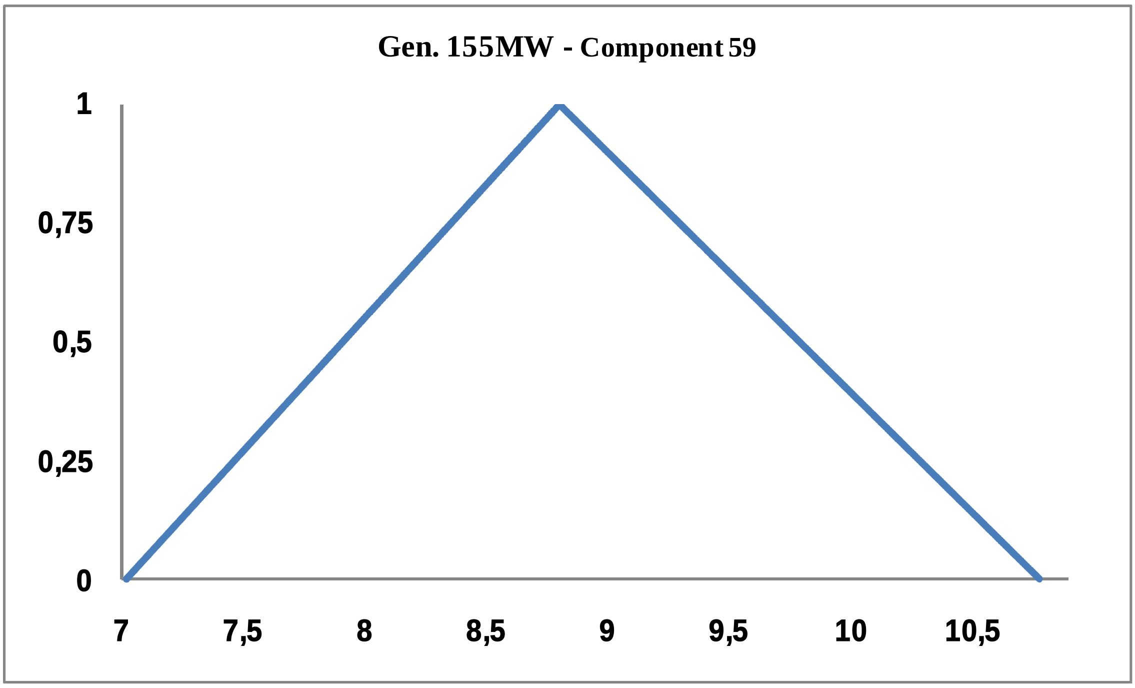

Gen. 12MW - Component 54
1
0,75
0,5
0,25
0
1,8
2,3
2,8
3,3
3,8

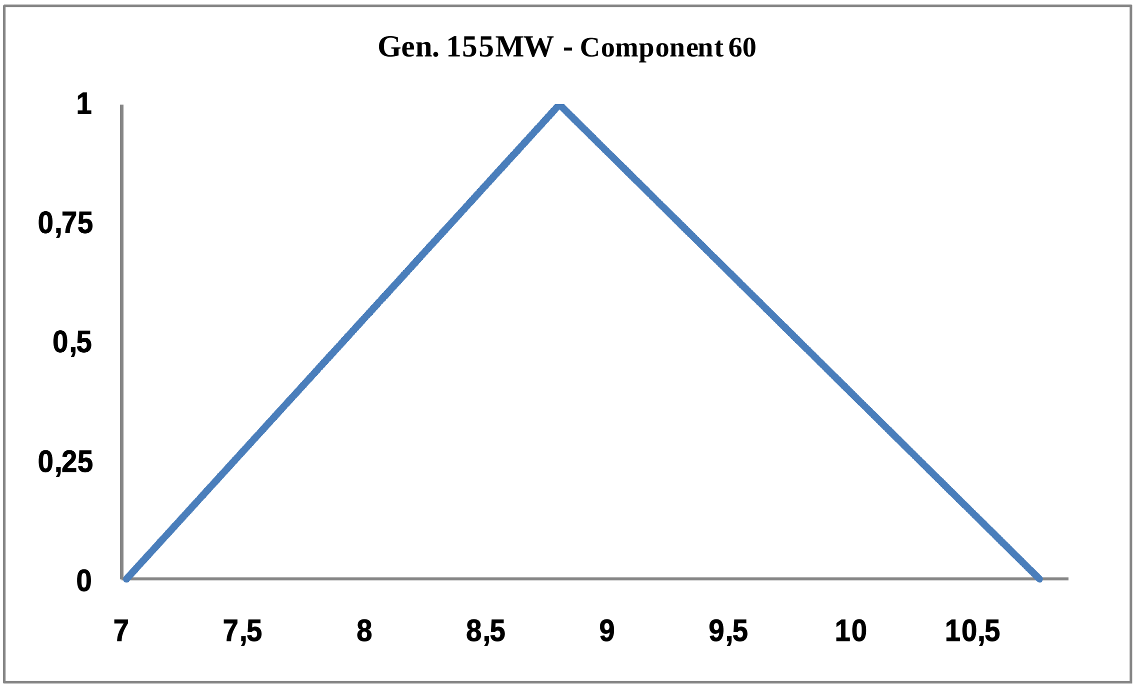

Gen. 12MW - Component 55
1
0,75
0,5
0,25
0
1,8
2,3
2,8
3,3
3,8

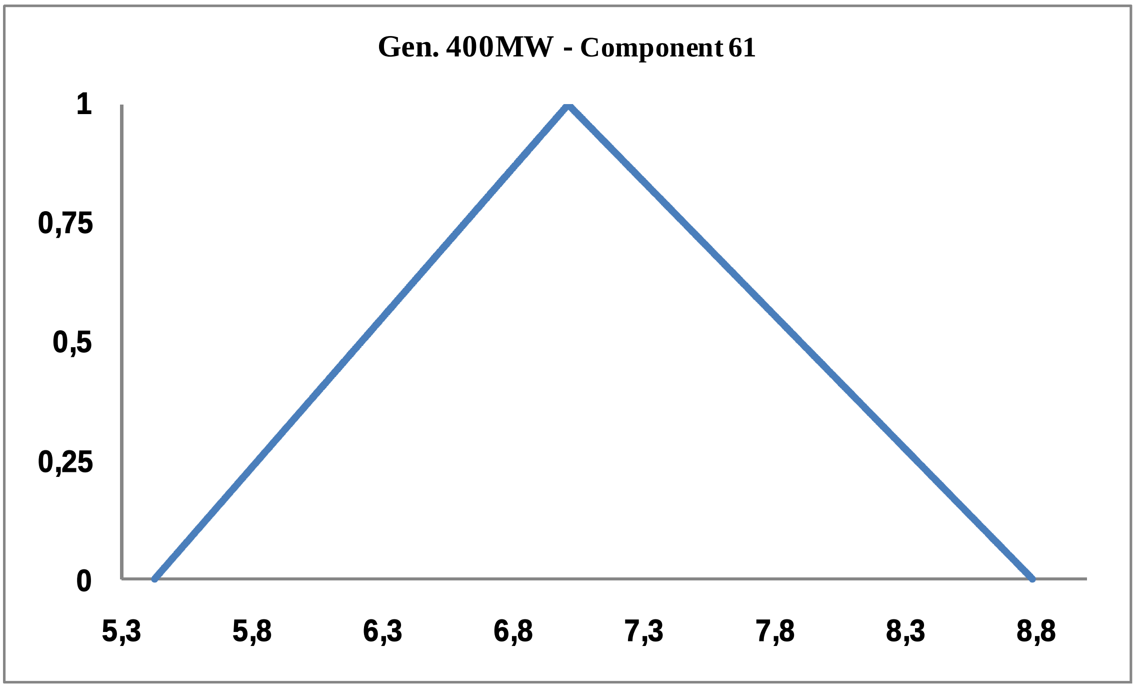

Gen. 12MW - Component 56
1
0,75
0,5
0,25
0
1,8
2,3
2,8
3,3
3,8

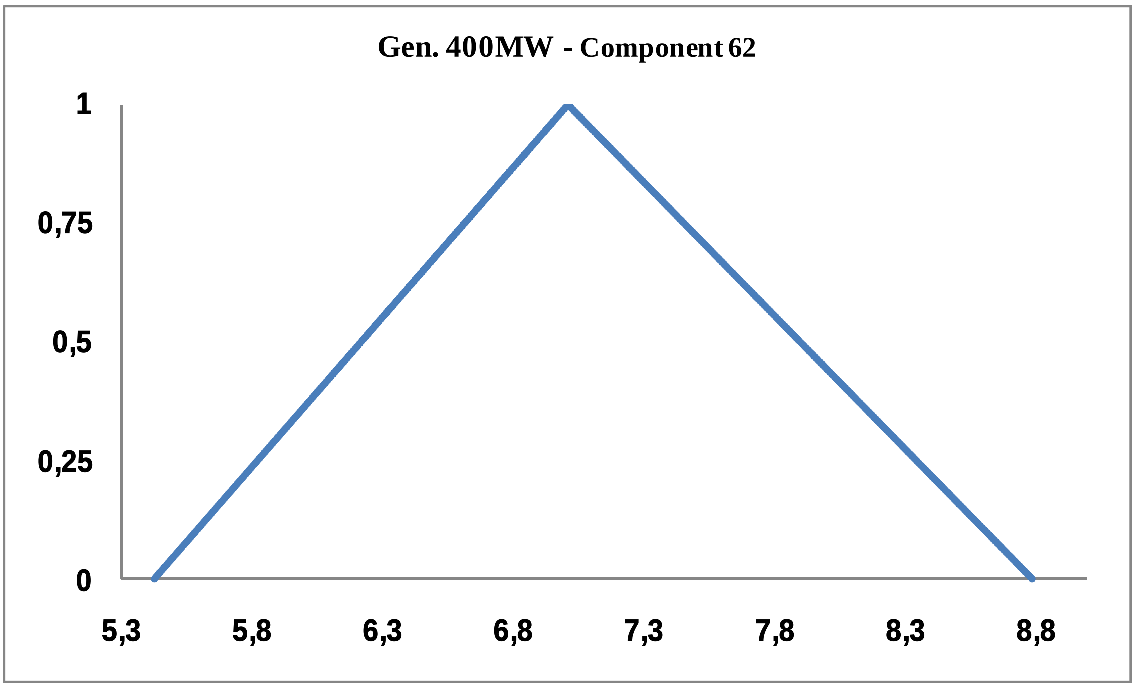

Gen. 12MW - Component 57
1
0,75
0,5
0,25
0
1,8
2,3
2,8
3,3
3,8

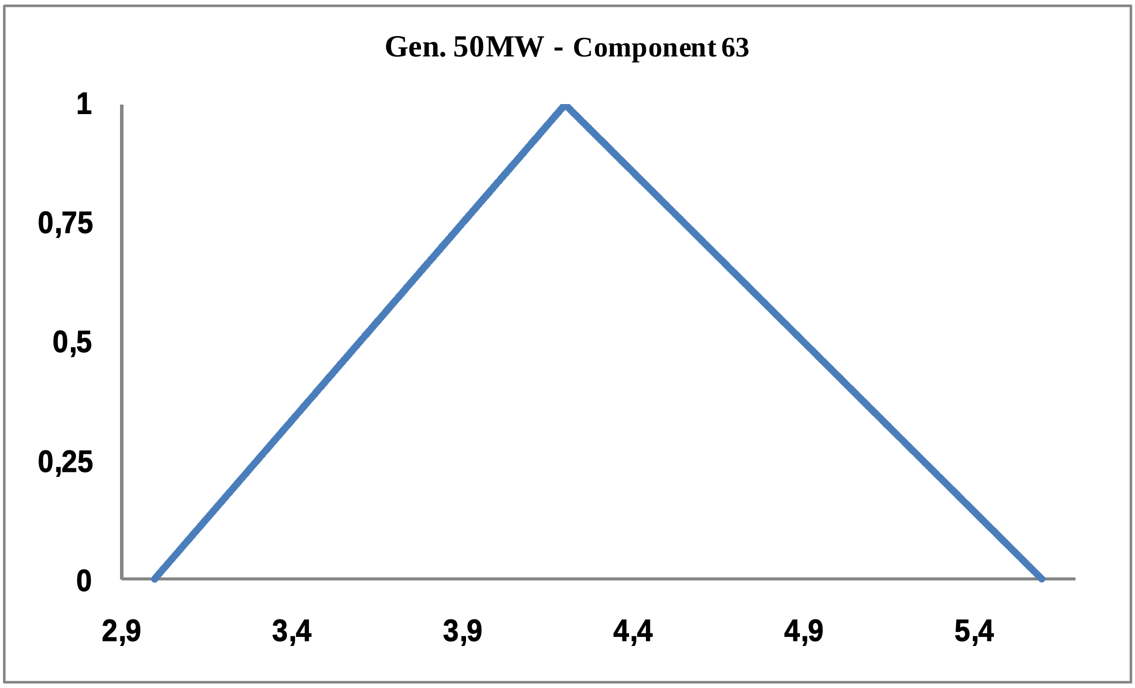

Gen. 12MW - Component 58
1
0,75
0,5
0,25
0
1,8
2,3
2,8
3,3
3,8


Gen. 155MW - Component 59
1
0,75
0,5
0,25
0
7
7,5
8
8,5
9
9,5
10
10,5

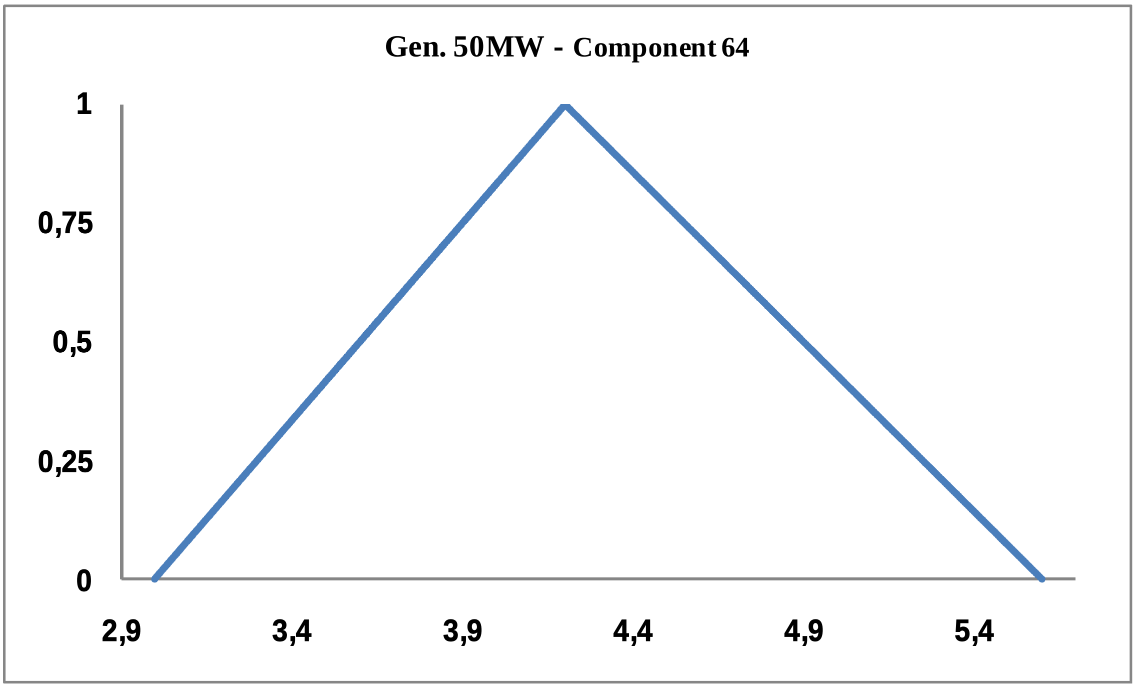

Gen. 155MW - Component 60
1
0,75
0,5
0,25
0
7
7,5
8
8,5
9
9,5
10
10,5


Gen. 400MW - Component 61
1
0,75
0,5
0,25
0
5,3
5,8
6,3
6,8
7,3
7,8
8,3
8,8

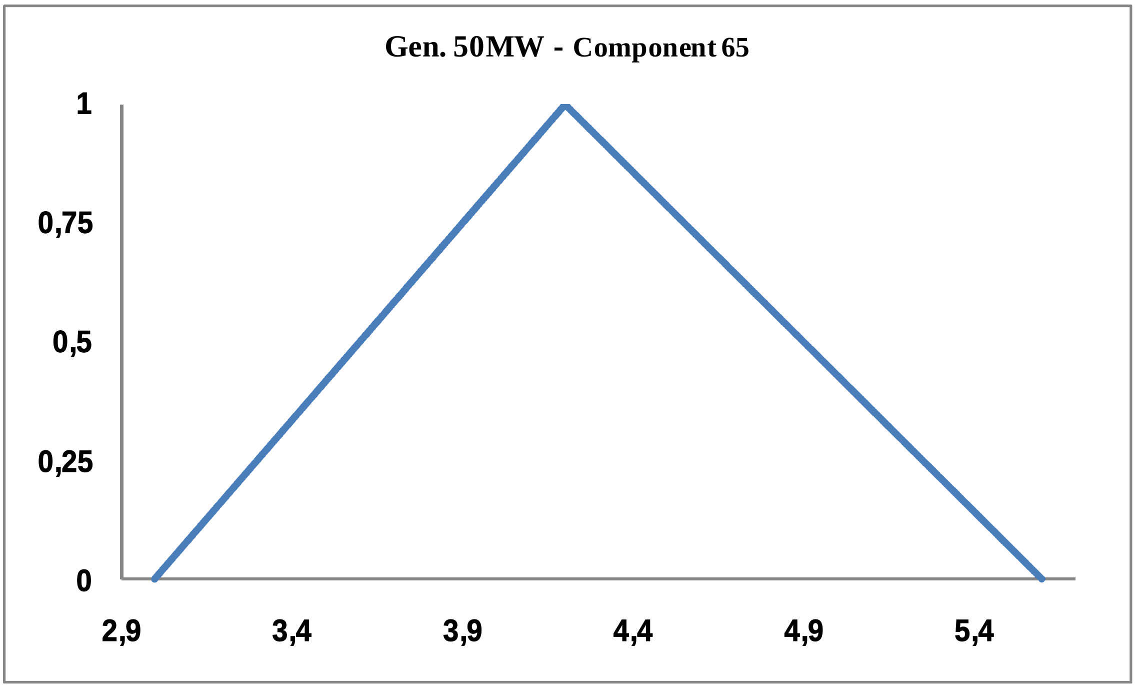

Gen. 400MW - Component 62
1
0,75
0,5
0,25
0
5,3
5,8
6,3
6,8
7,3
7,8
8,3
8,8

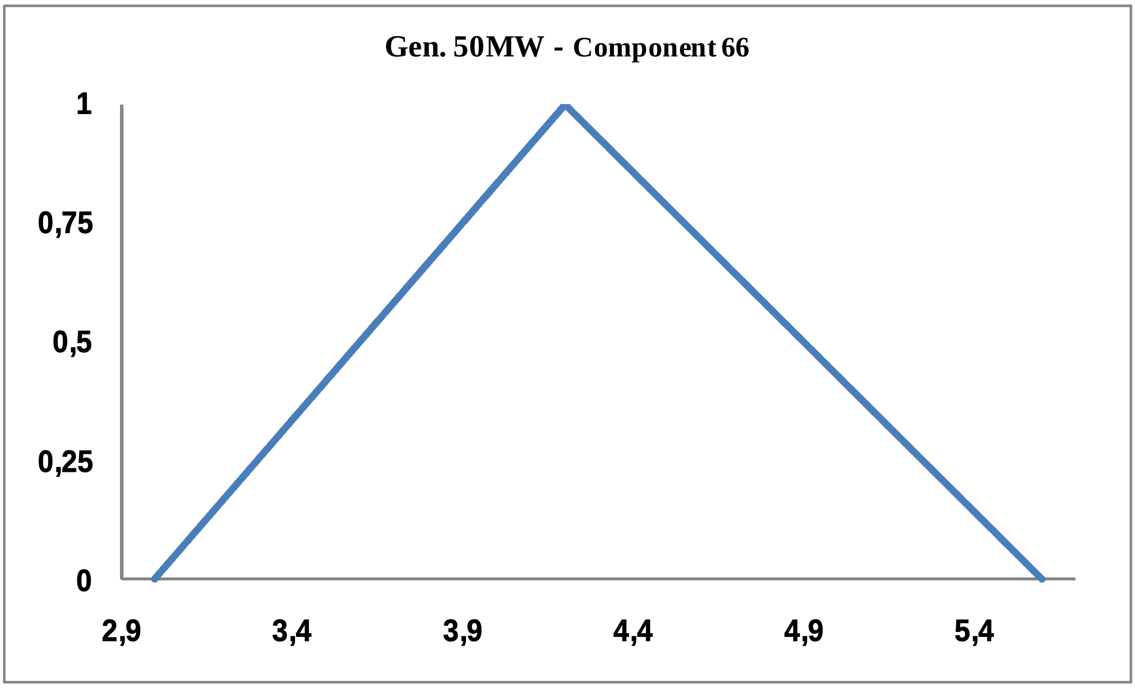


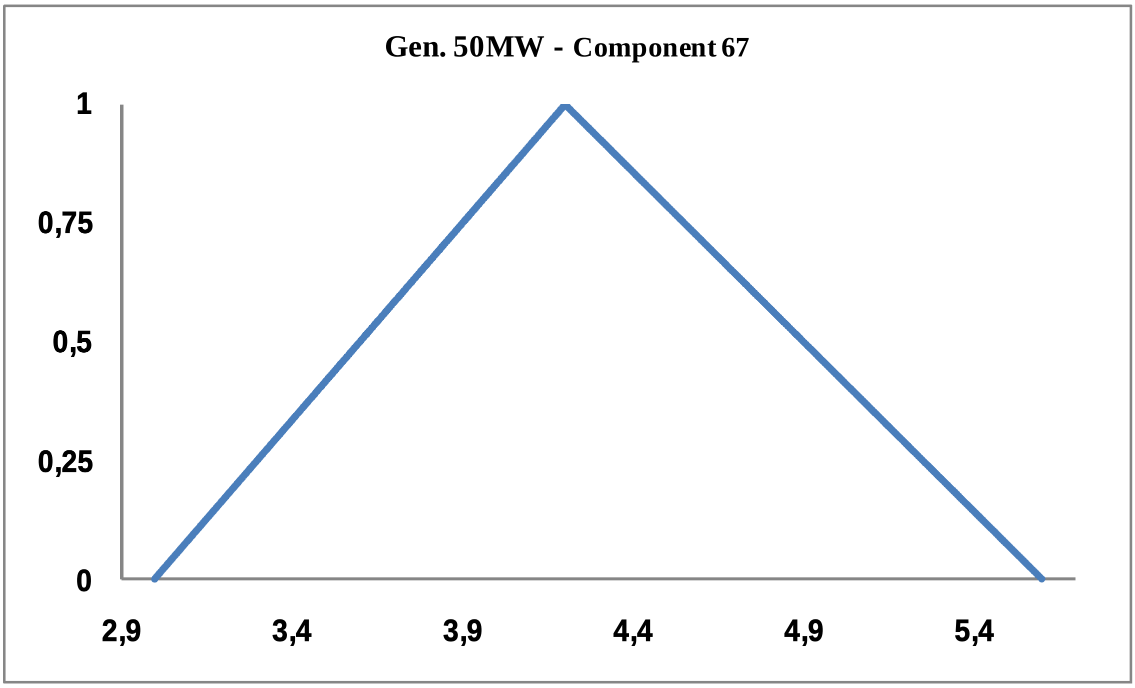
Gen. 50MW - Component 63

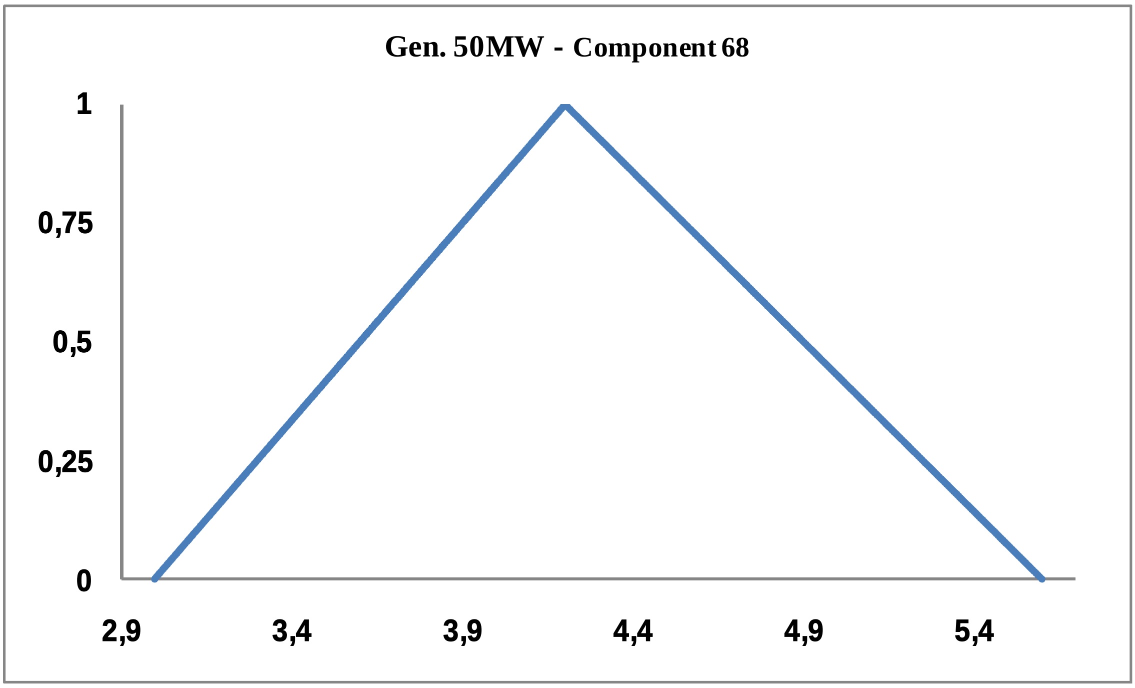


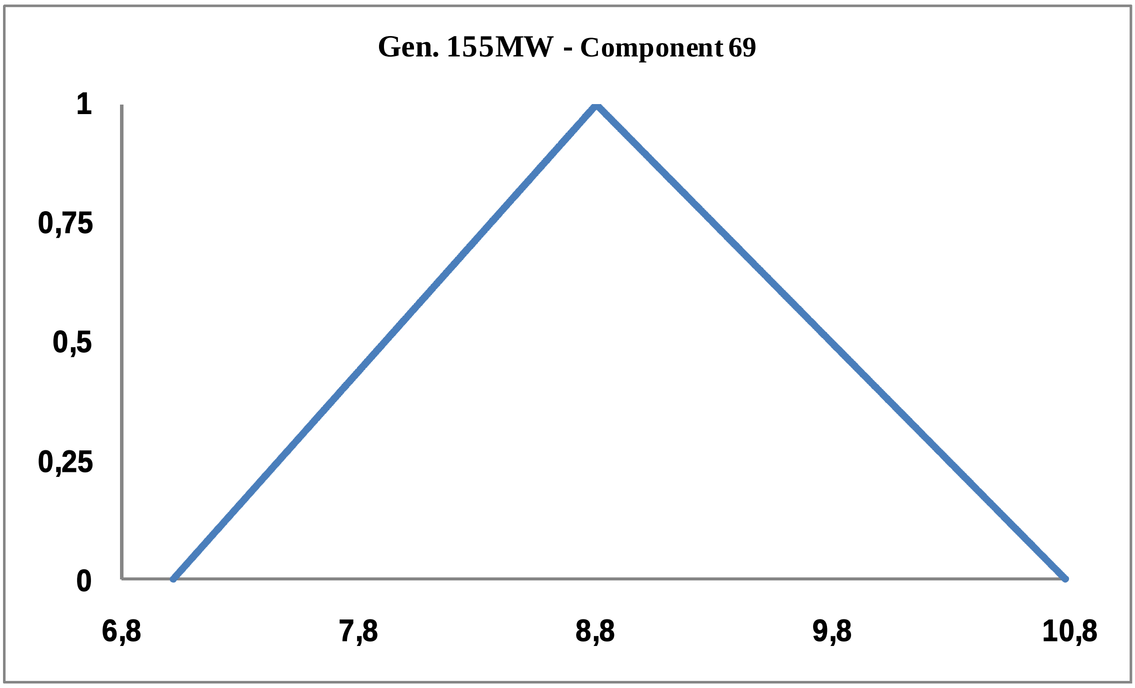
Gen. 50MW - Component 64

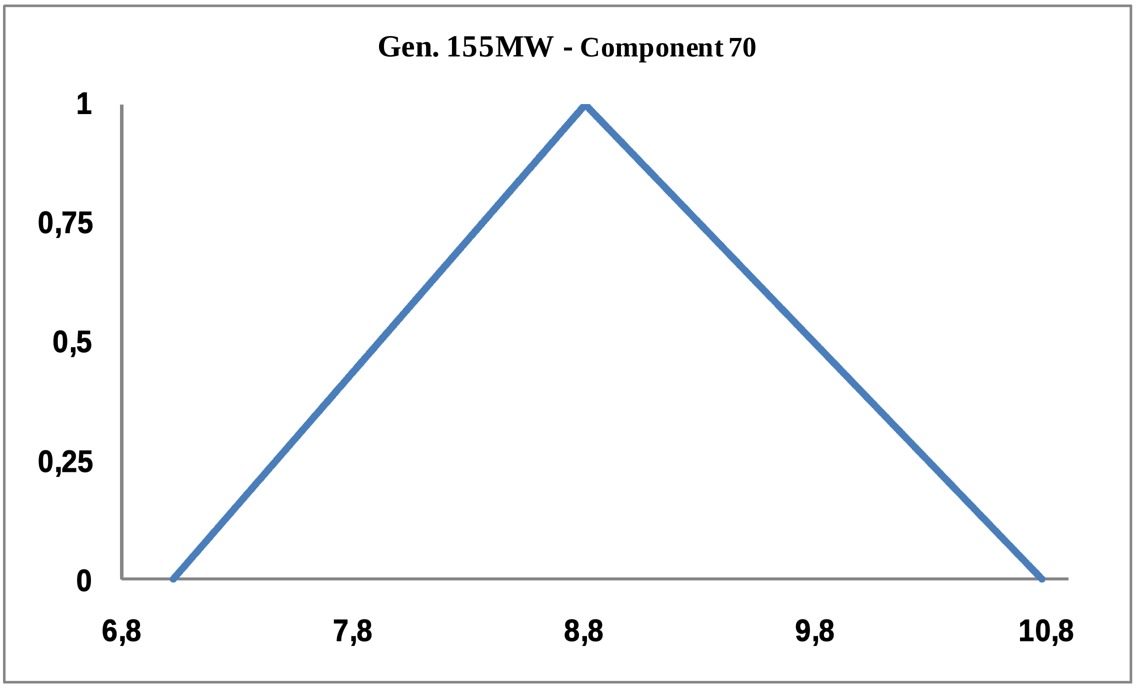

Gen. 50MW - Component 65
1
0,75
0,5
0,25
0
2,9
3,4
3,9
4,4
4,9
5,4

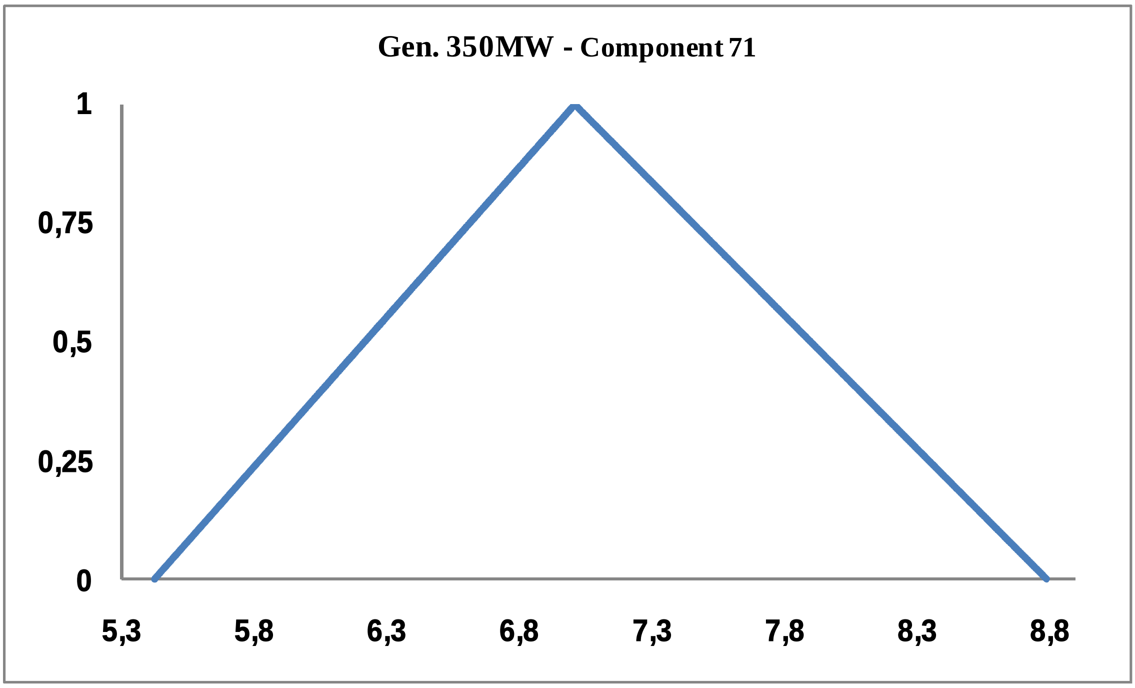

Gen. 50MW - Component 66
1
0,75
0,5
0,25
0
2,9
3,4
3,9
4,4
4,9
5,4


Gen. 50MW - Component 67
1
0,75
0,5
0,25
0
2,9
3,4
3,9
4,4
4,9
5,4


Gen. 50MW - Component 68
1
0,75
0,5
0,25
0
2,9
3,4
3,9
4,4
4,9
5,4

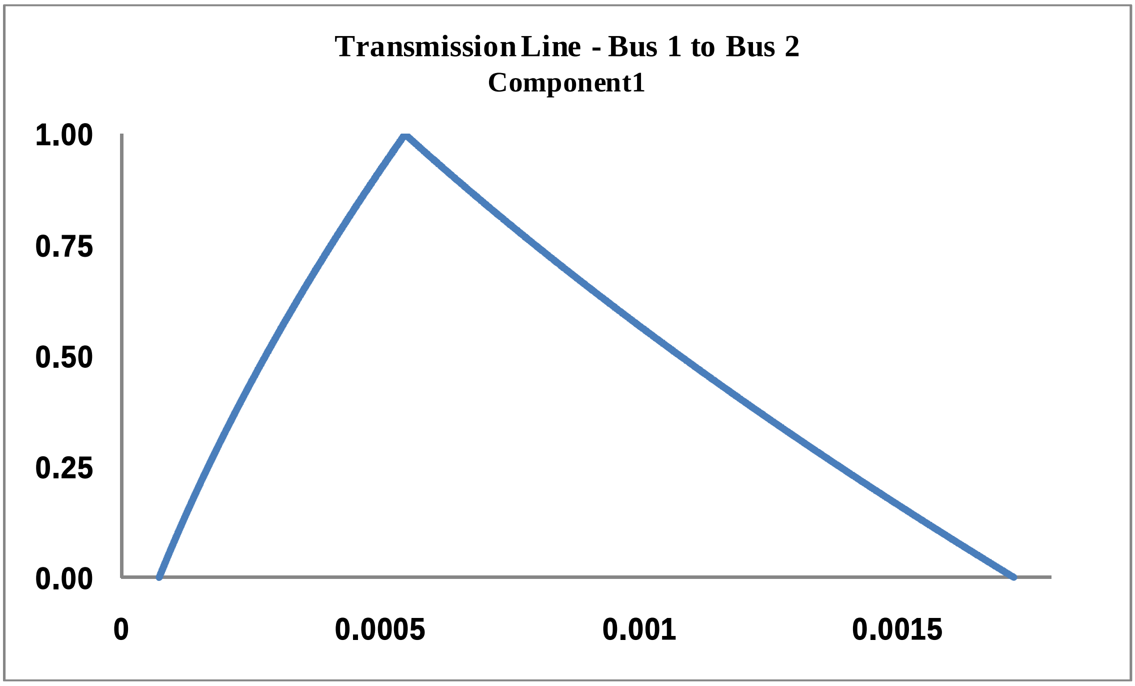

Gen. 155MW - Component 69
1
0,75
0,5
0,25
0
6,8
7,8
8,8
9,8
10,8

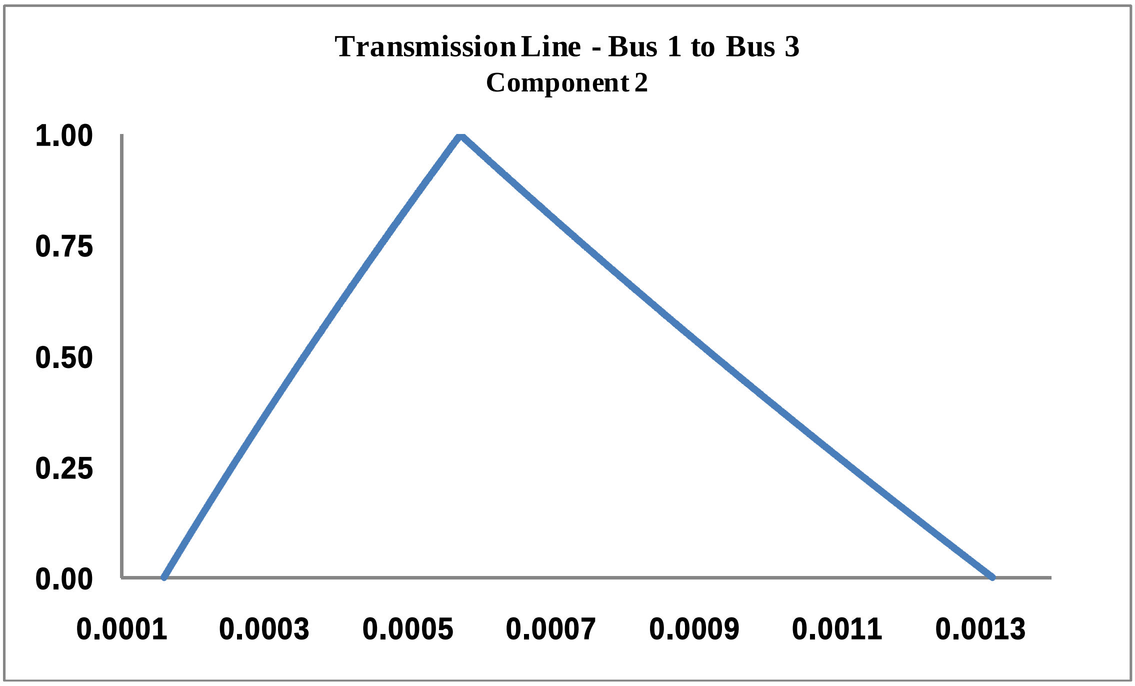

Gen. 155MW - Component 70
1
0,75
0,5
0,25
0
6,8
7,8
8,8
9,8
10,8

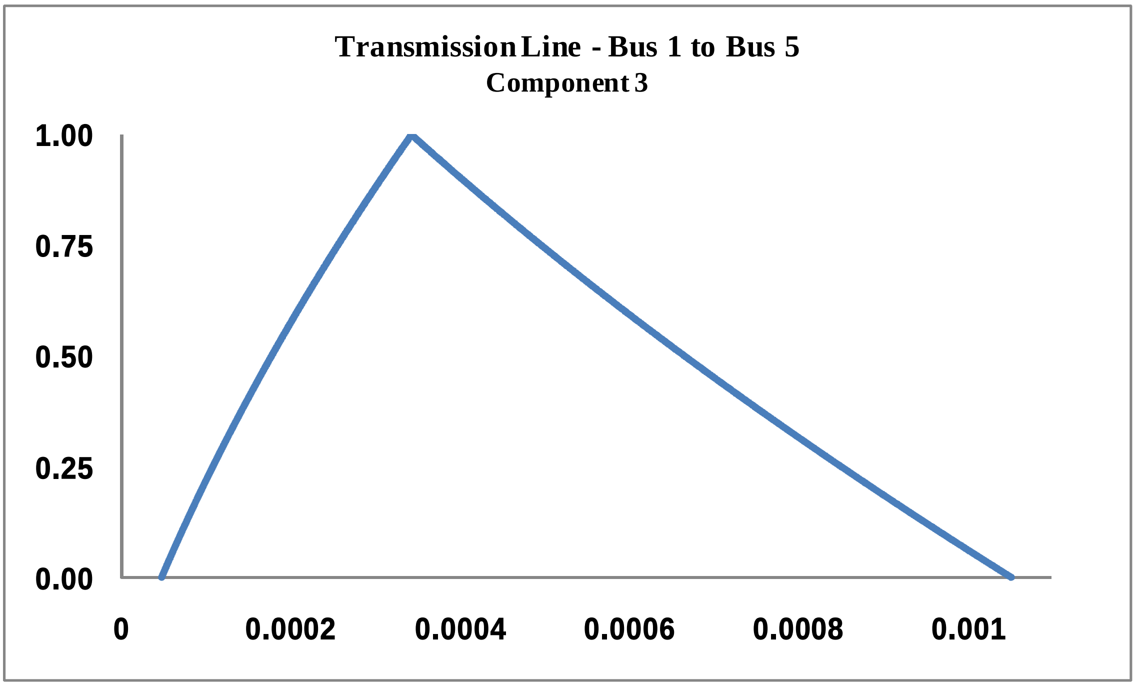

Gen. 350MW - Component 71
1
0,75
0,5
0,25
0
5,3
5,8
6,3
6,8
7,3
7,8
8,3
8,8

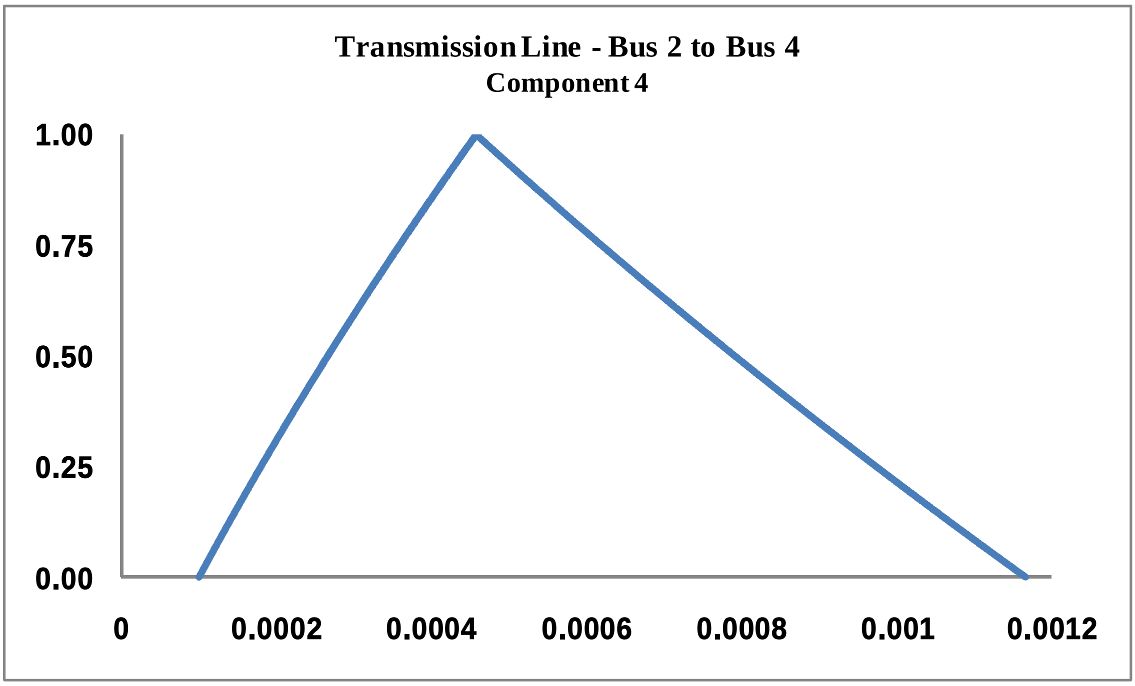
Annex 6

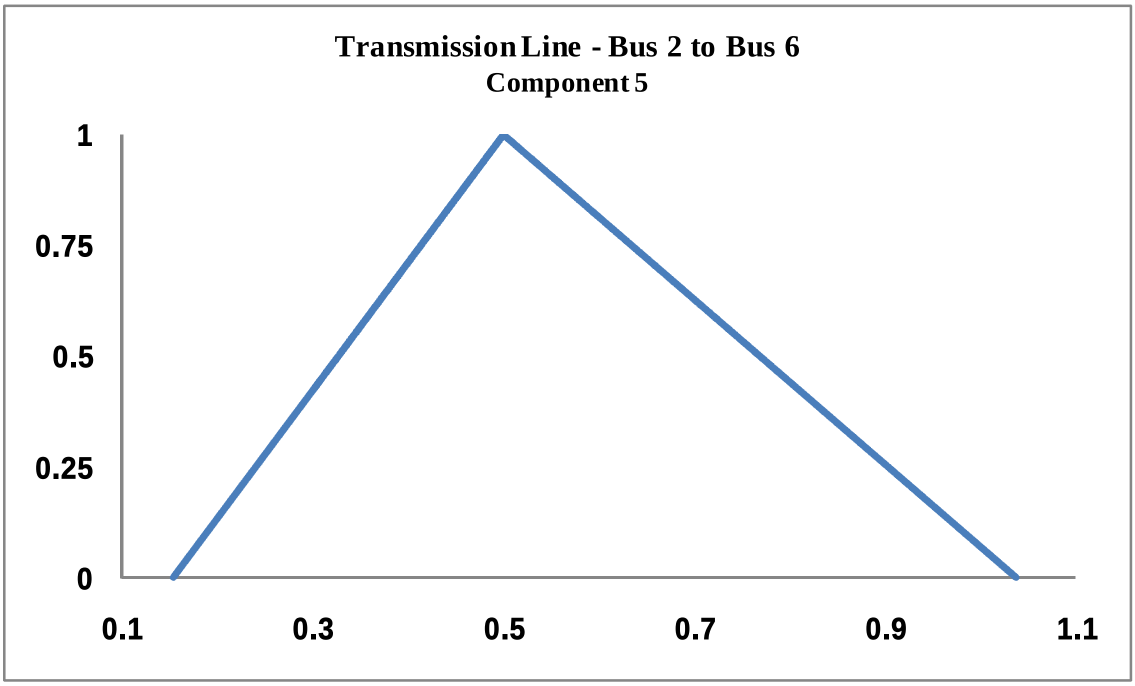
Fuzzy membership functions for Unavailability or Failure Probability

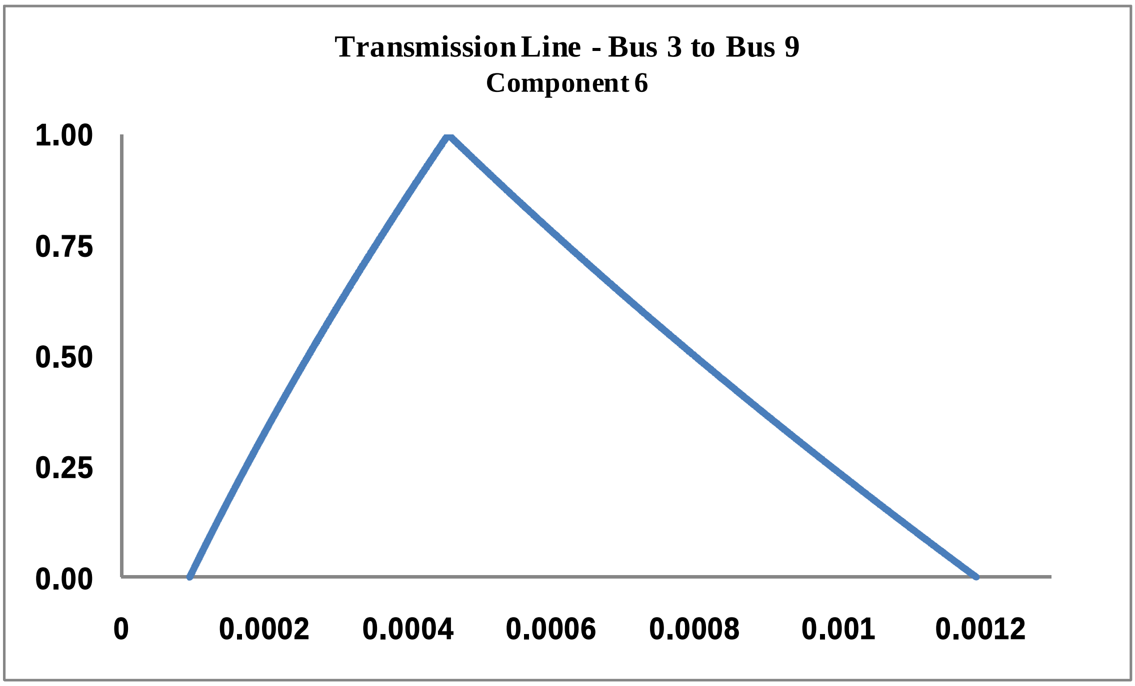


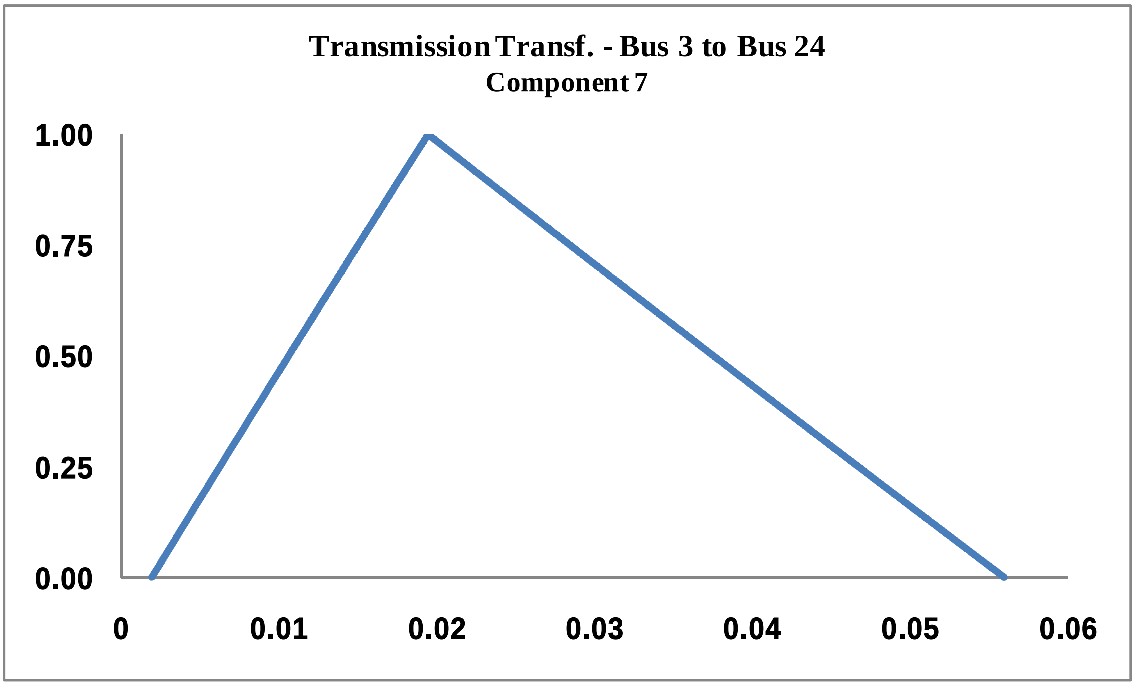


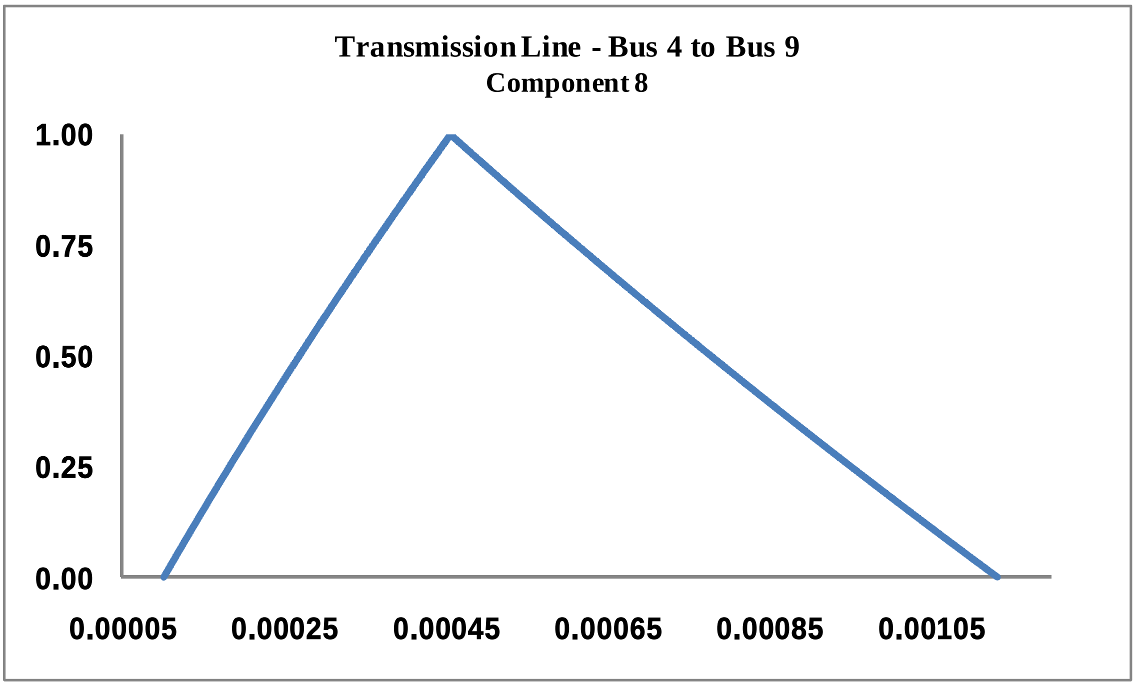

Transmission Line - Bus 1 to Bus 5
Component 3
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

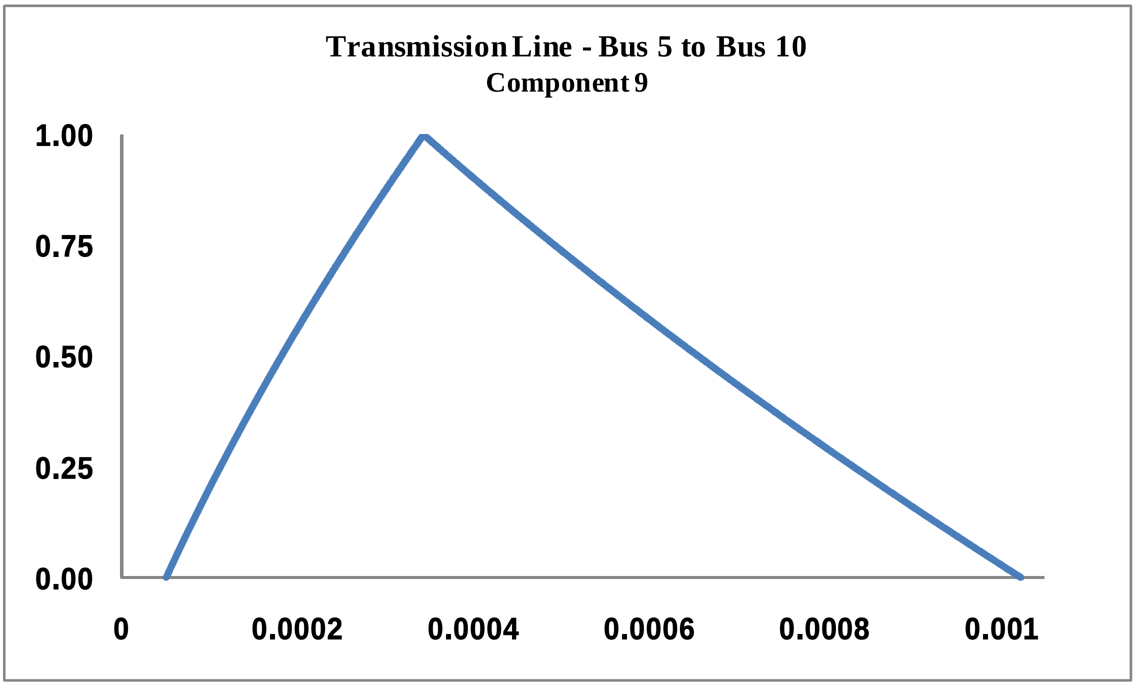

Transmission Line - Bus 2 to Bus 4
Component 4
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012

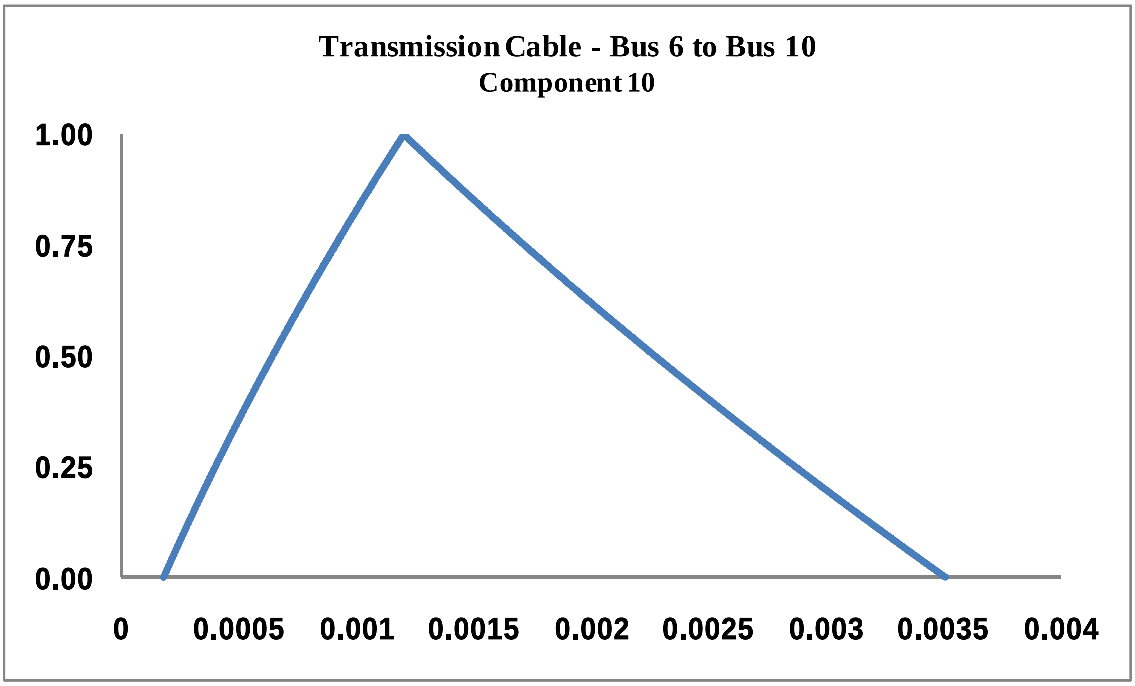

Transmission Line - Bus 2 to Bus 6
Component 5
1
0.75
0.5
0.25
0
0.1
0.3
0.5
0.7
0.9
1.1

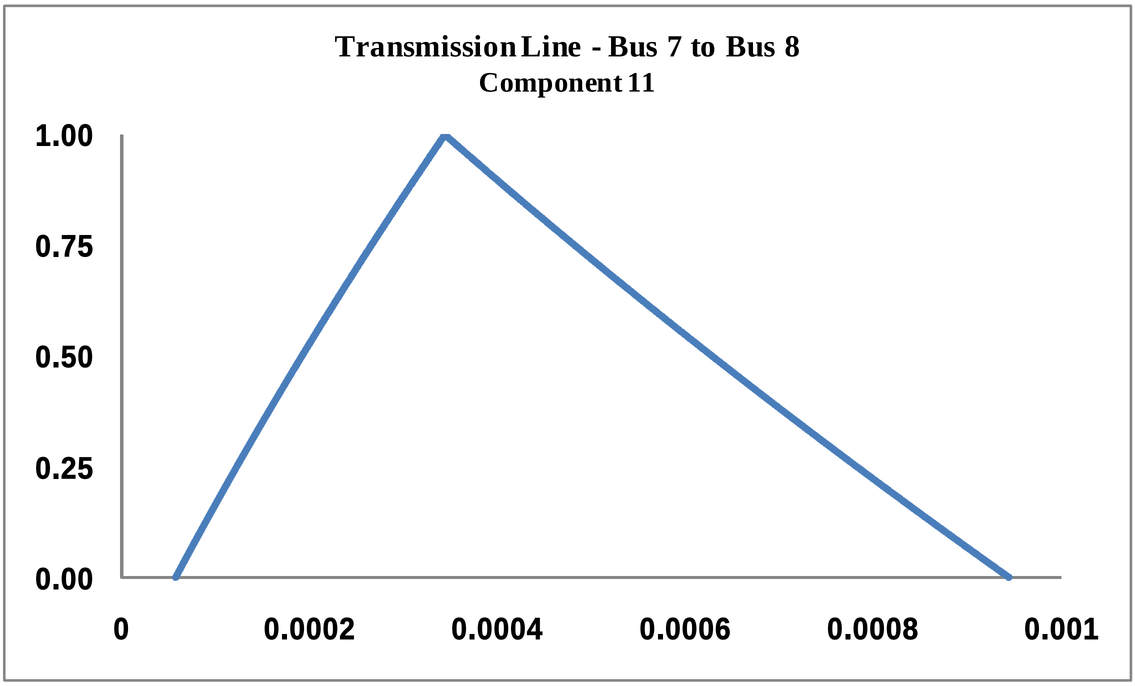

Transmission Line - Bus 3 to Bus 9
Component 6
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012

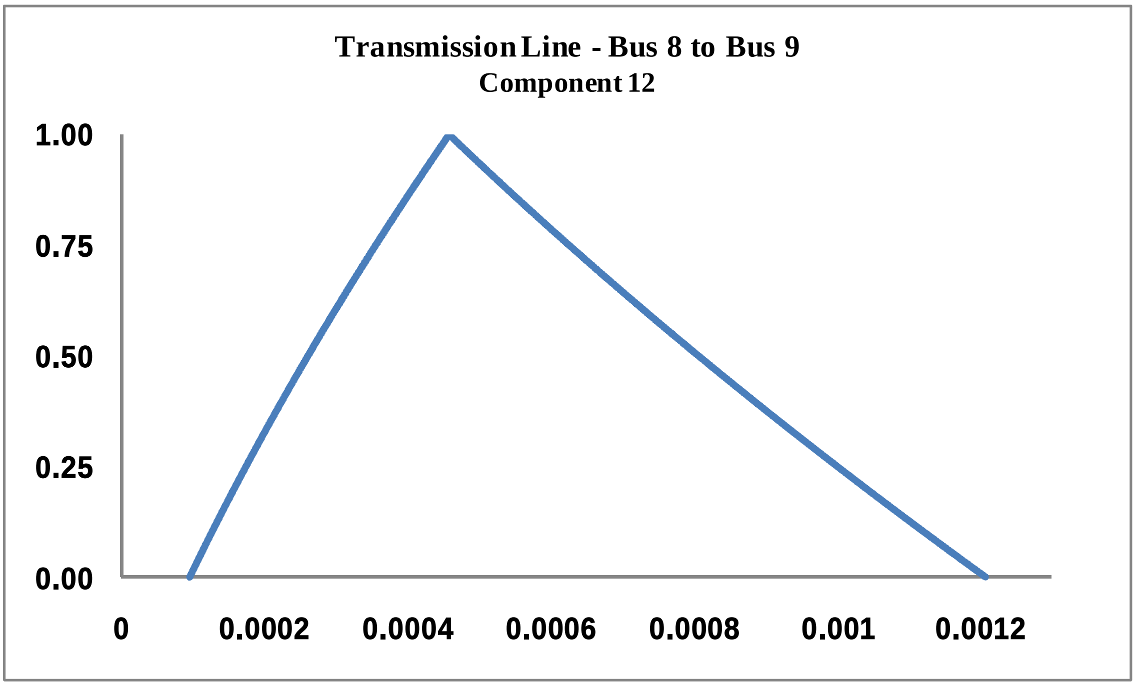

Transmission Transf. - Bus 3 to Bus 24
Component 7
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06

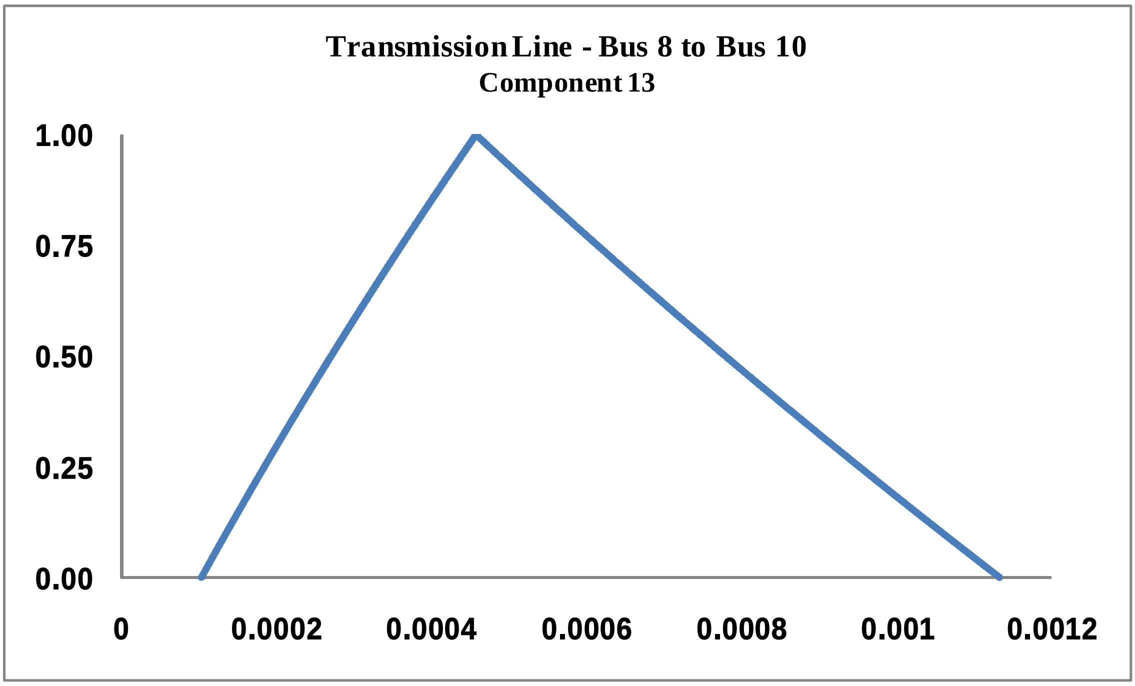

Transmission Line - Bus 4 to Bus 9
Component 8
1.00
0.75
0.50
0.25
0.00
0.00005
0.00025
0.00045
0.00065
0.00085
0.00105

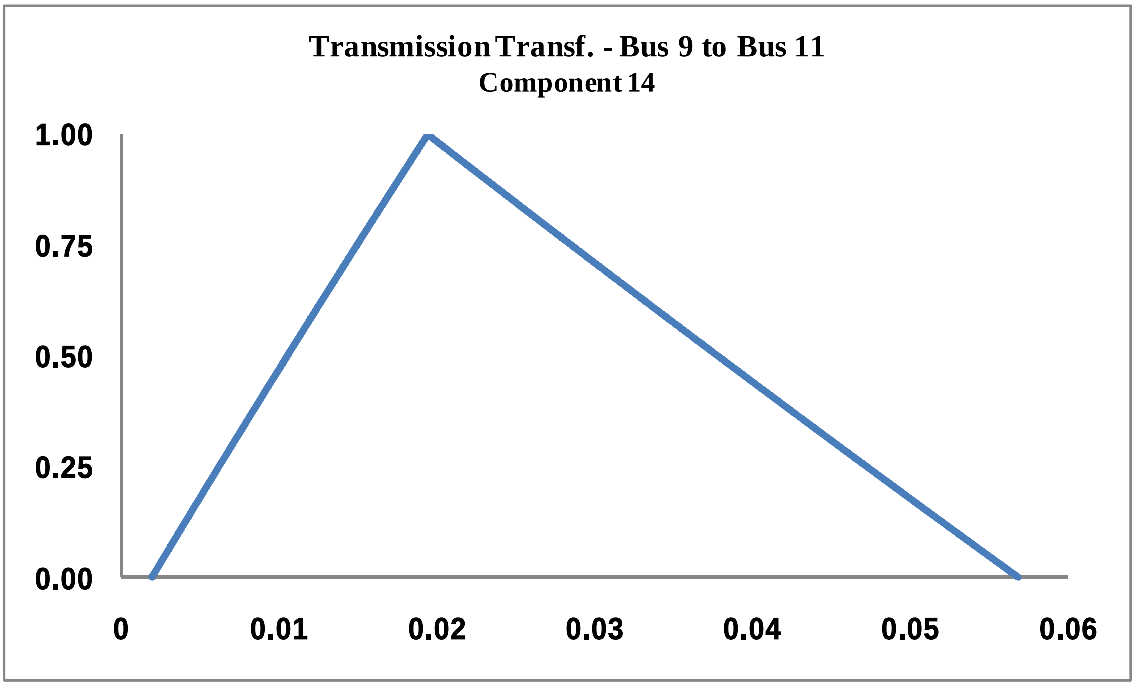

Transmission Line - Bus 5 to Bus 10
Component 9
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

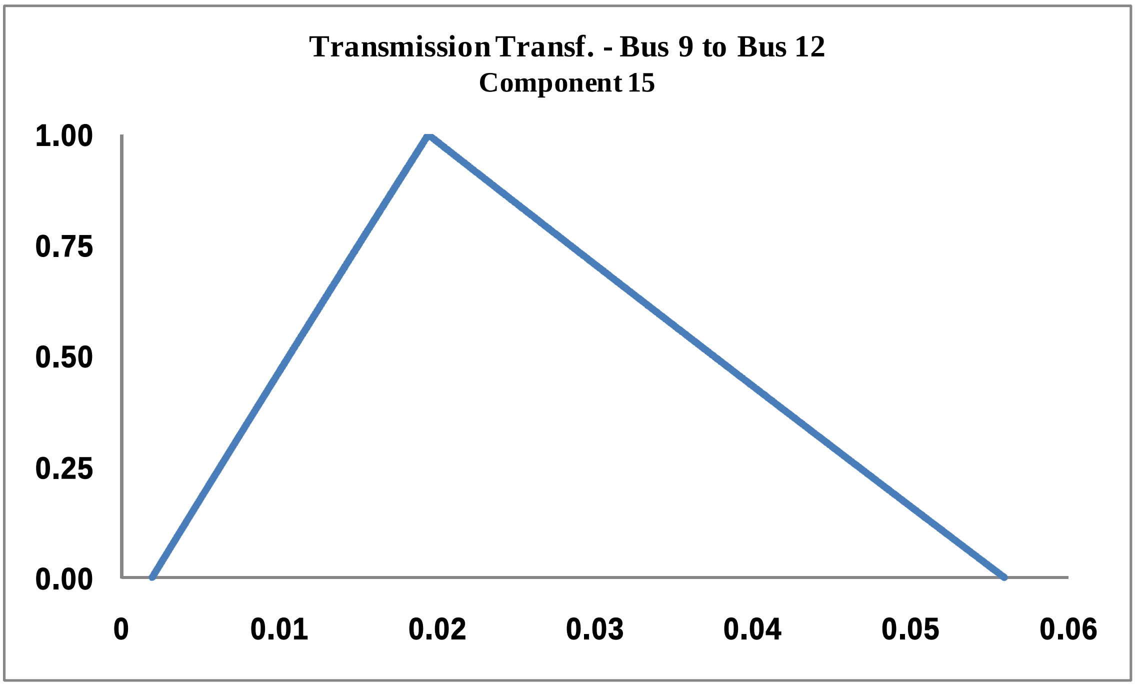

Transmission Cable - Bus 6 to Bus 10
Component 10
1.00
0.75
0.50
0.25
0.00
0
0.0005
0.001
0.0015
0.002
0.0025
0.003
0.0035
0.004

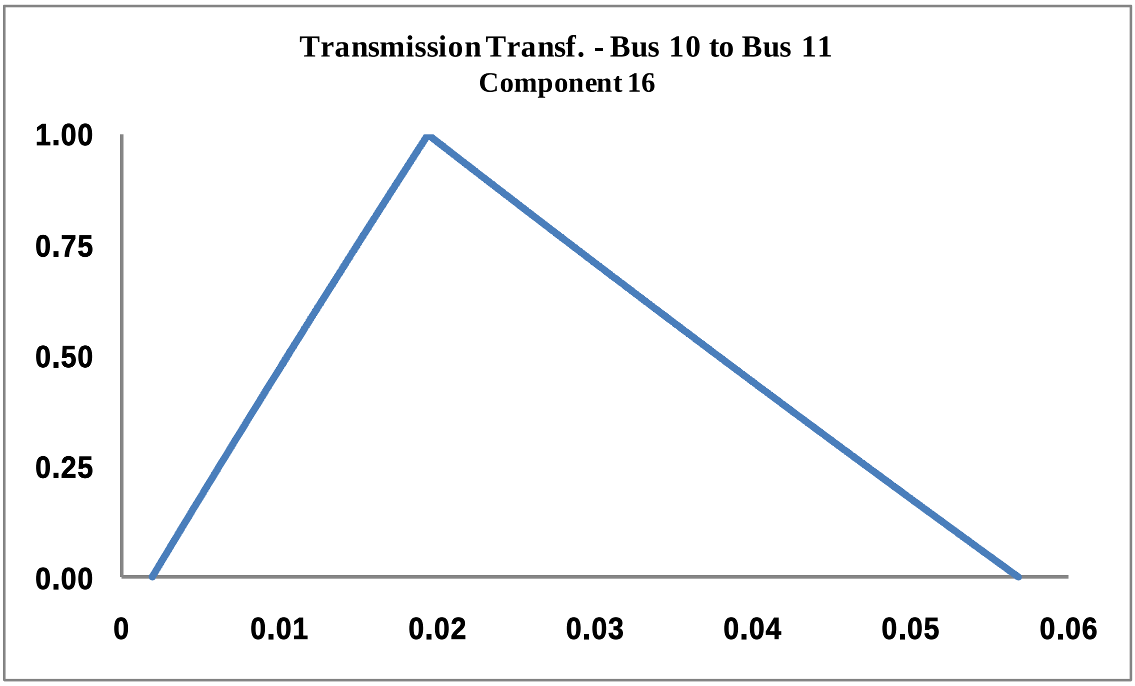

Transmission Line - Bus 7 to Bus 8
Component 11
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

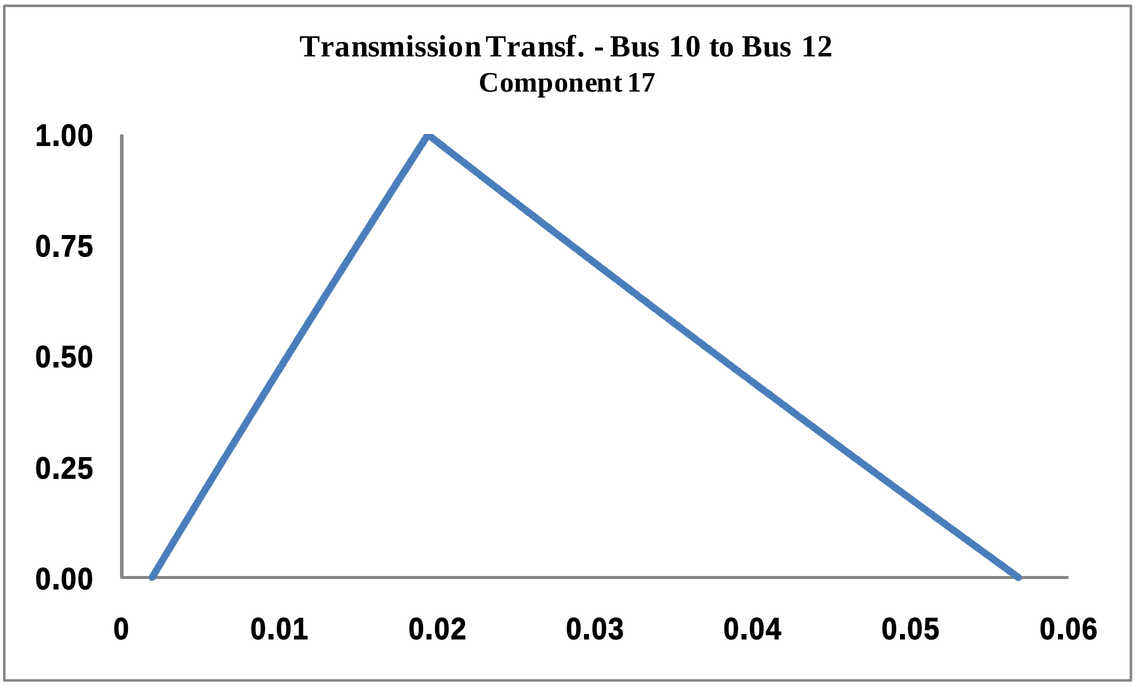

Transmission Line - Bus 8 to Bus 9
Component 12
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012

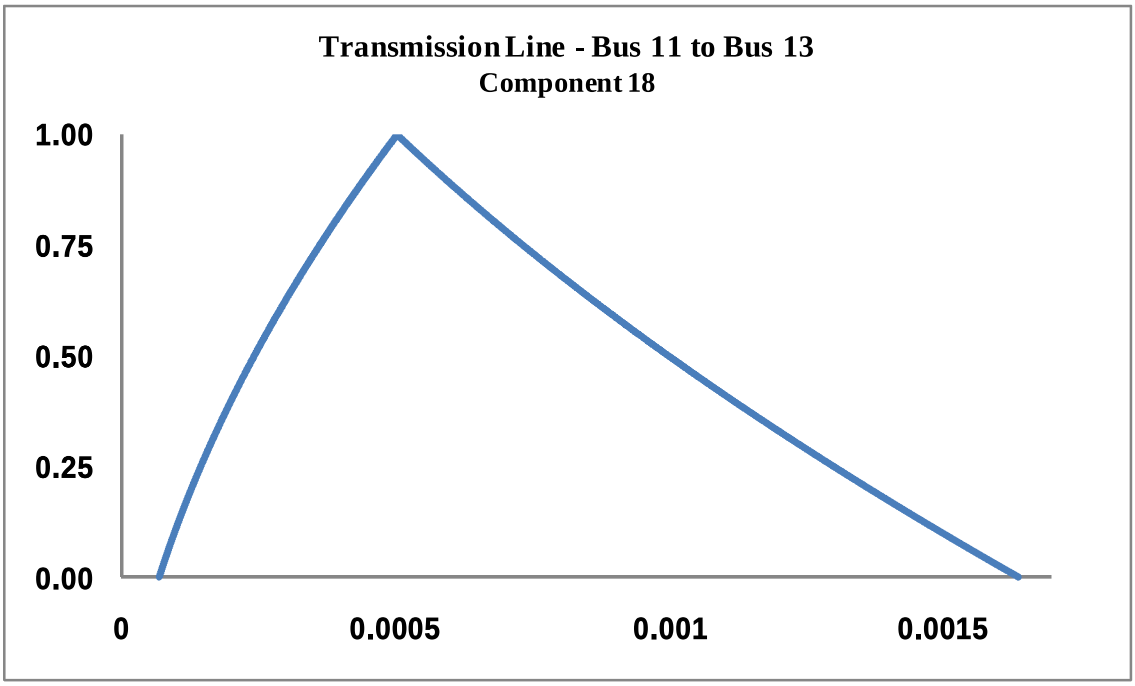

Transmission Line - Bus 8 to Bus 10
Component 13
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012

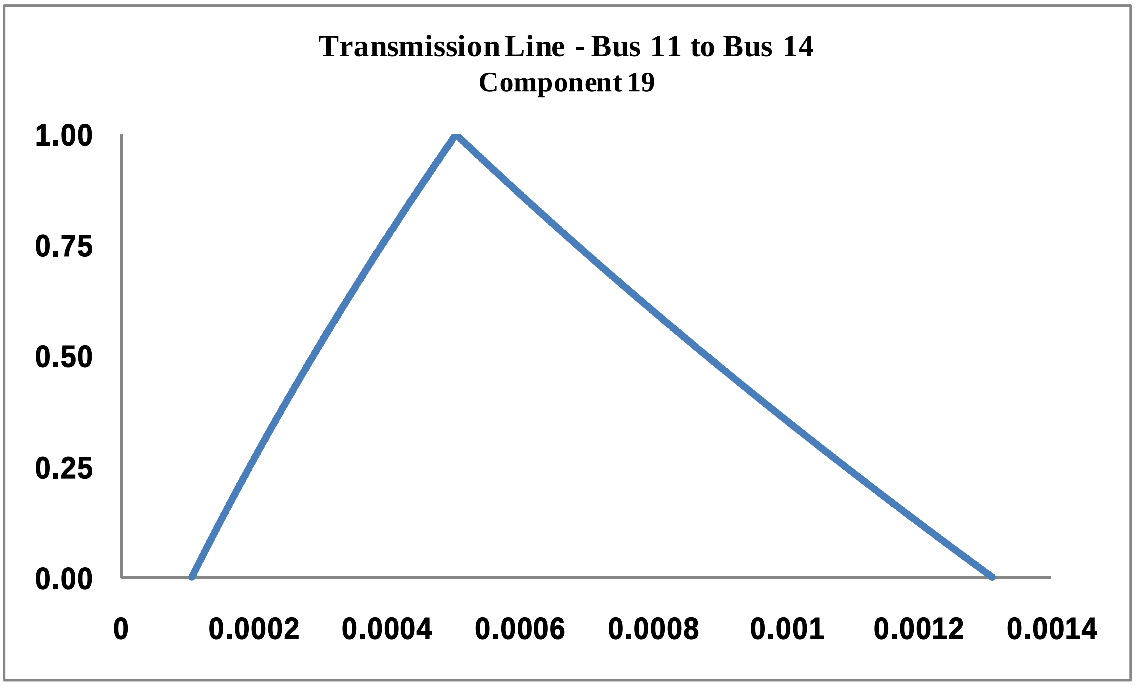

Transmission Transf. - Bus 9 to Bus 11
Component 14
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06

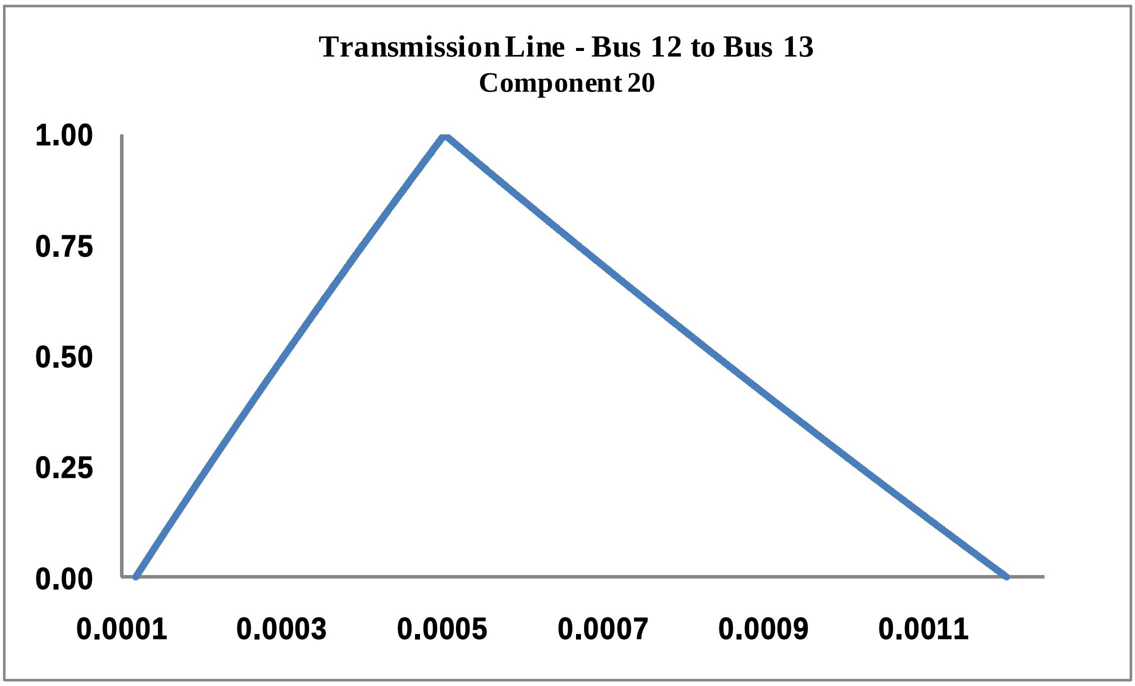

Transmission Transf. - Bus 9 to Bus 12
Component 15
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06

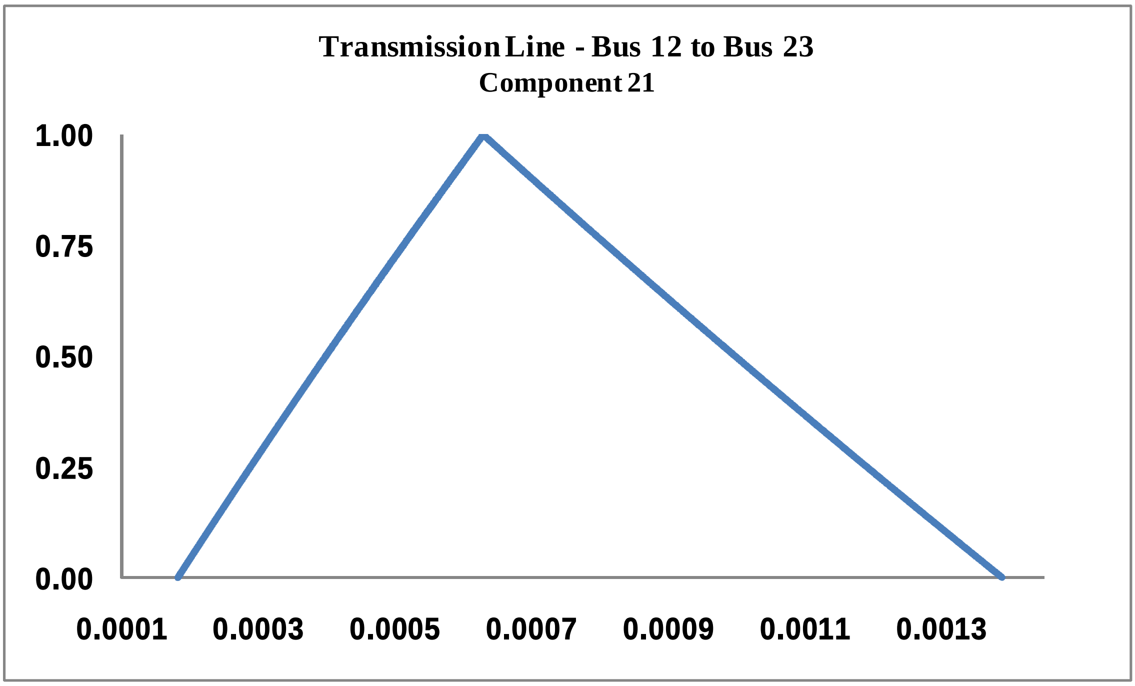

Transmission Transf. - Bus 10 to Bus 11
Component 16
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06

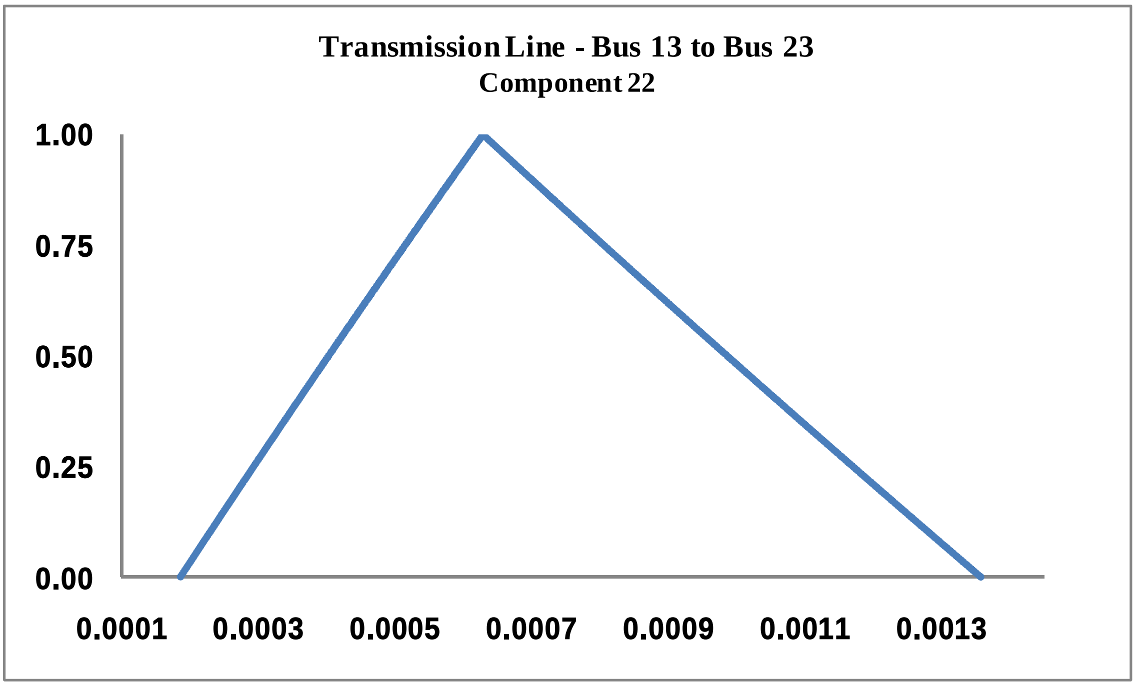

Transmission Transf. - Bus 10 to Bus 12
Component 17
1.00
0.75
0.50
0.25
0.00
0
0.01
0.02
0.03
0.04
0.05
0.06

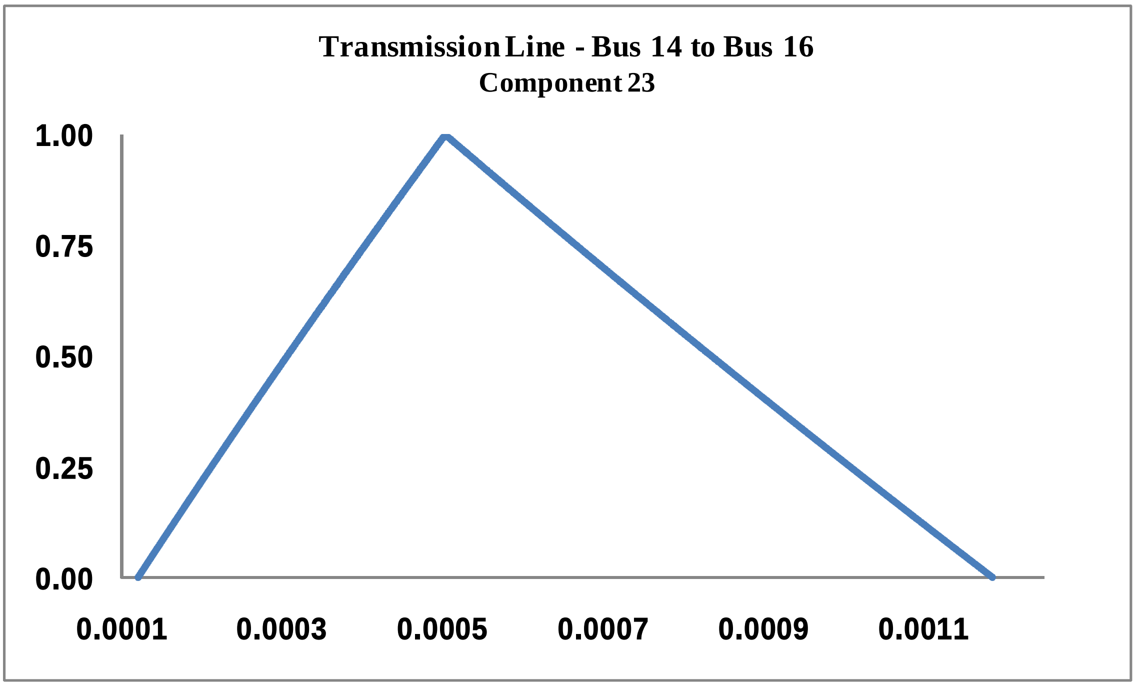

Transmission Line - Bus 11 to Bus 13
Component 18
1.00
0.75
0.50
0.25
0.00
0
0.0005
0.001
0.0015

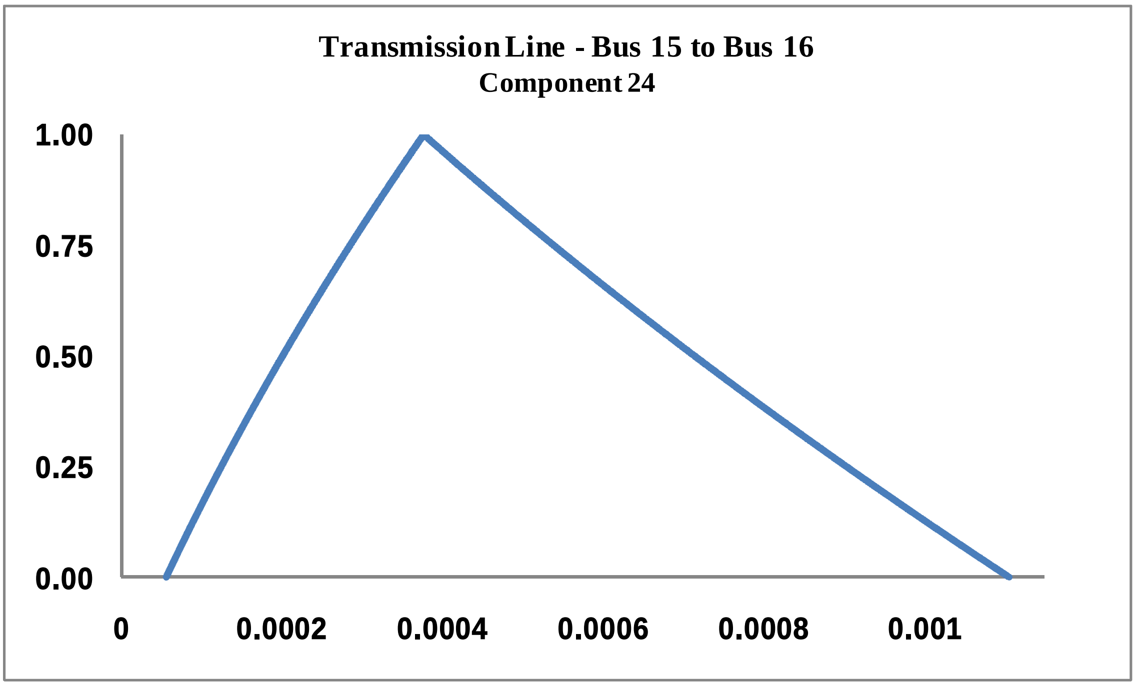

Transmission Line - Bus 11 to Bus 14
Component 19
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012
0.0014

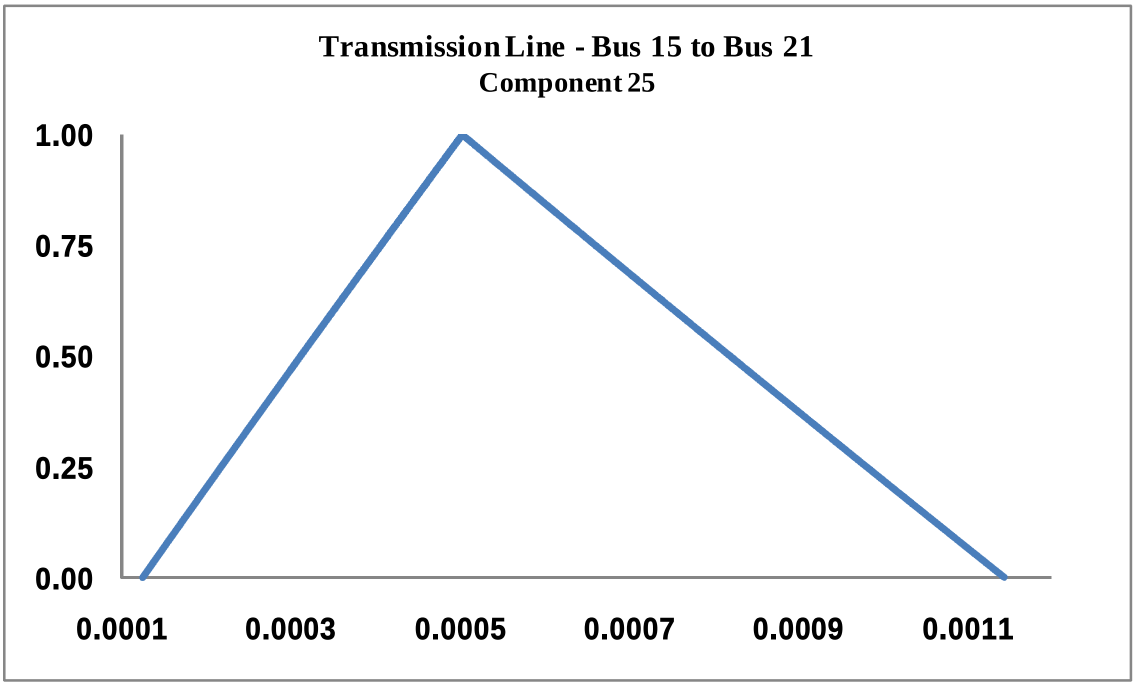

Transmission Line - Bus 12 to Bus 13
Component 20
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011

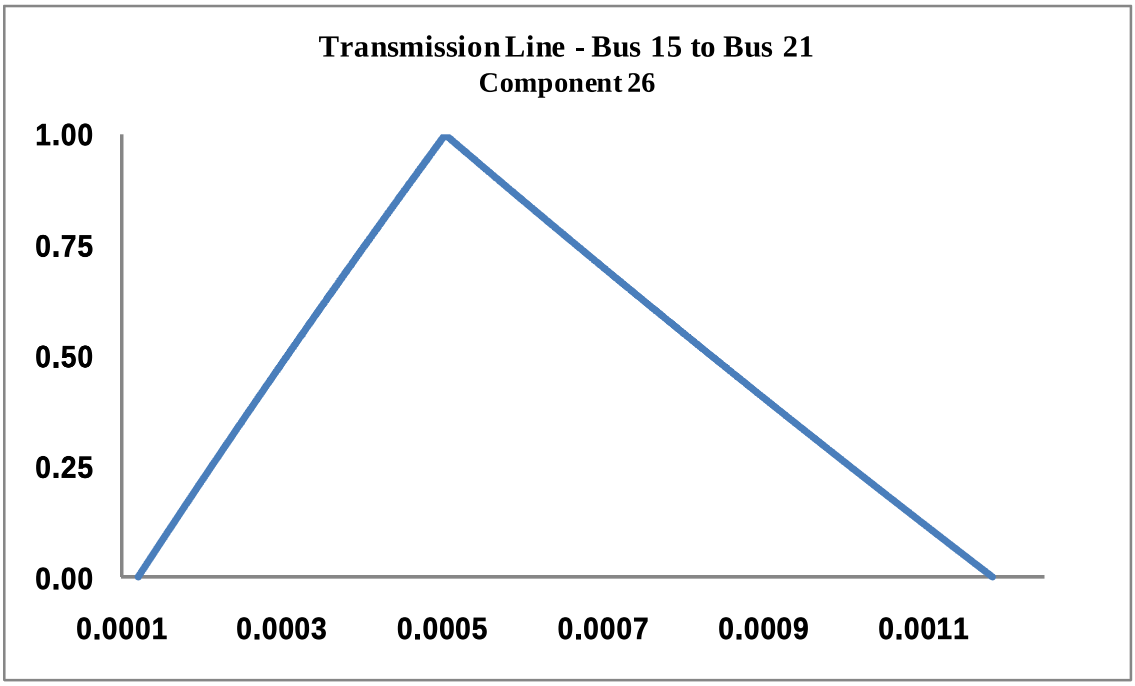

Transmission Line - Bus 12 to Bus 23
Component 21
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

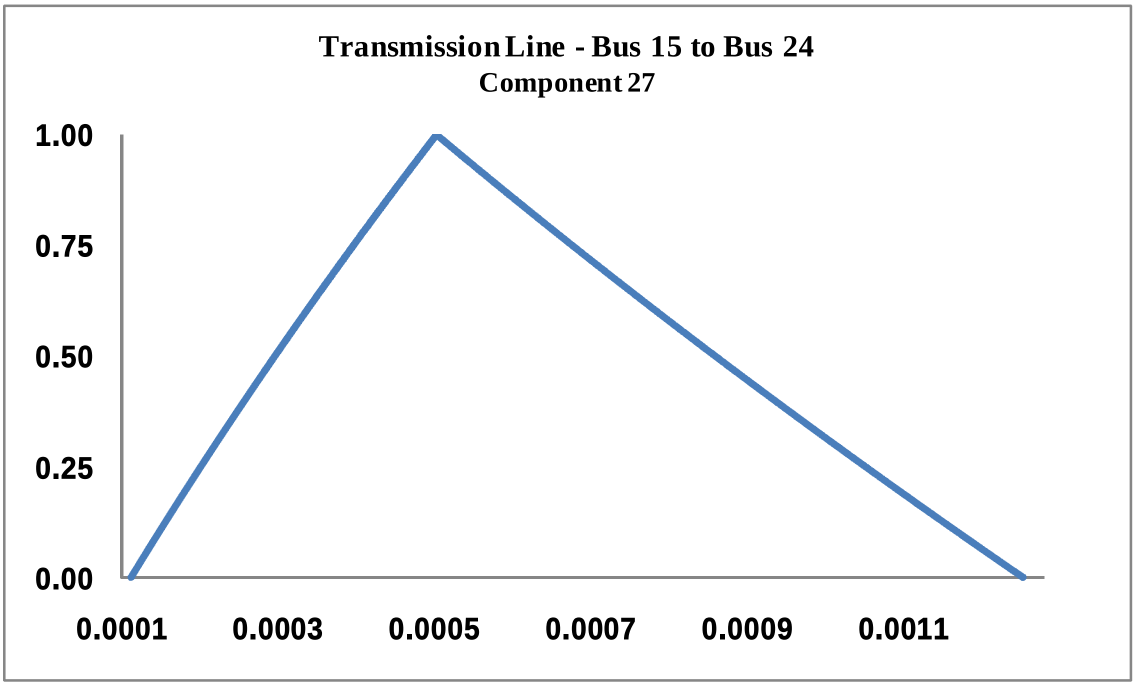

Transmission Line - Bus 13 to Bus 23
Component 22
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

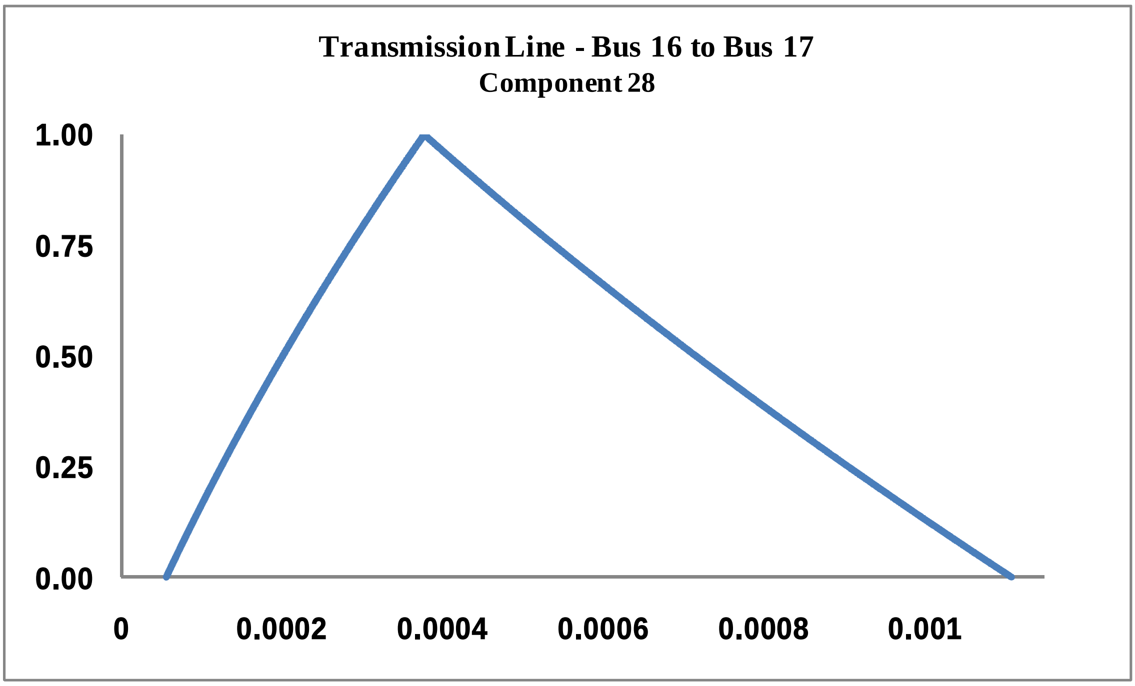

Transmission Line - Bus 14 to Bus 16
Component 23
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011

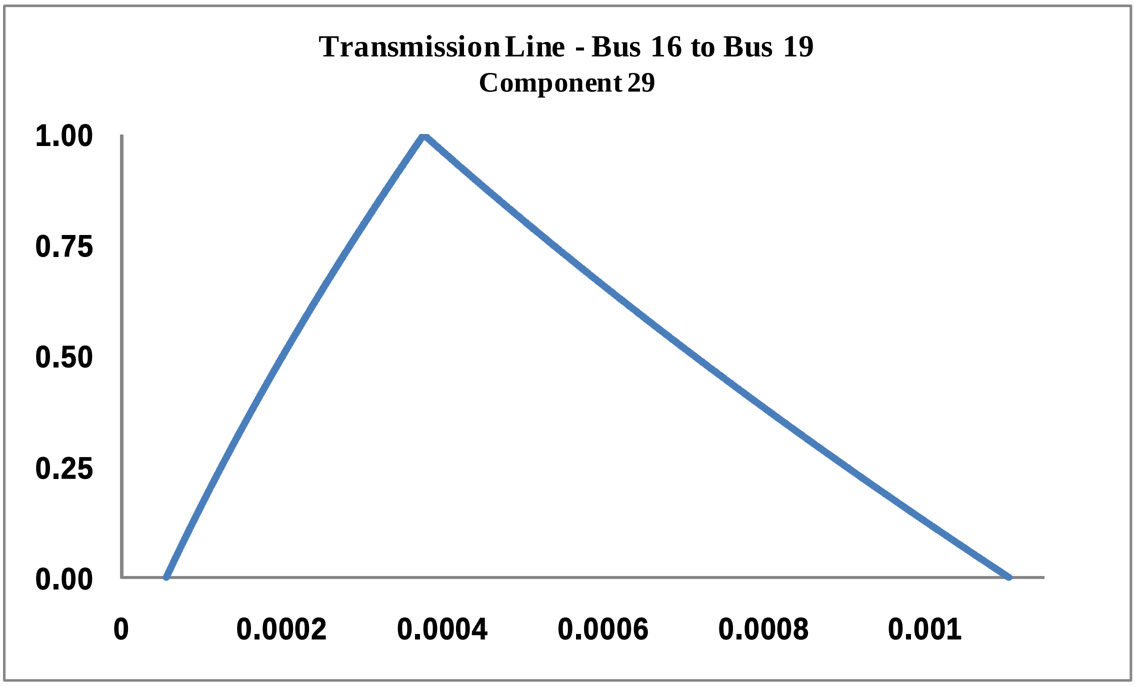

Transmission Line - Bus 15 to Bus 16
Component 24
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

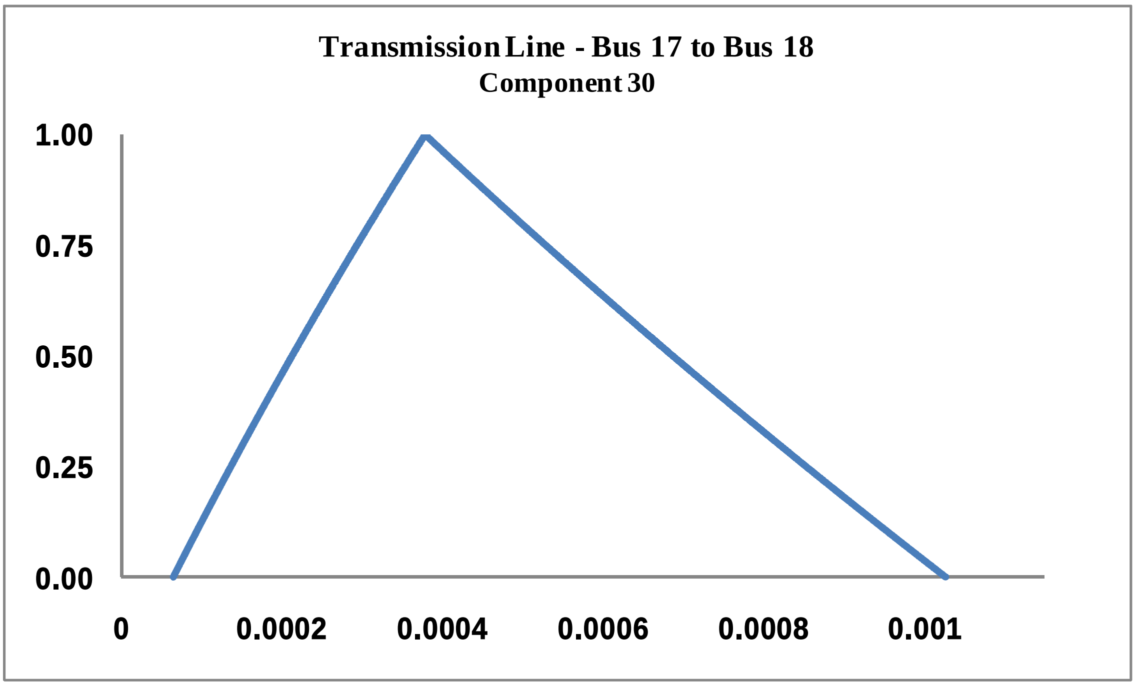

Transmission Line - Bus 15 to Bus 21
Component 25

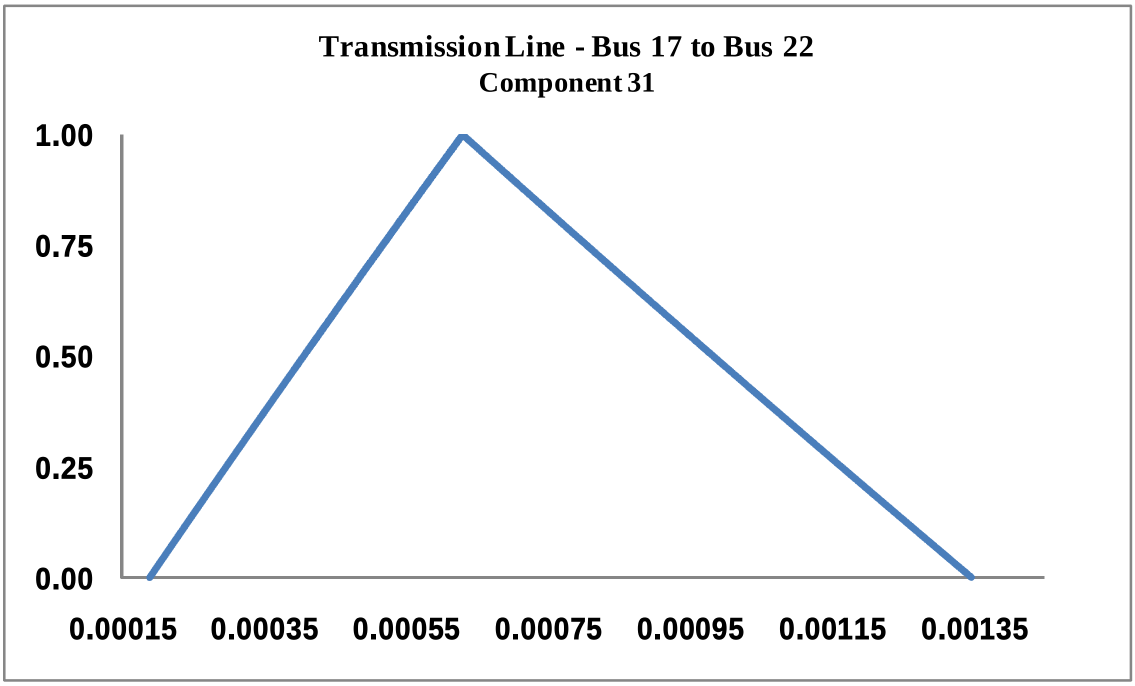

Transmission Line - Bus 15 to Bus 21
Component 26

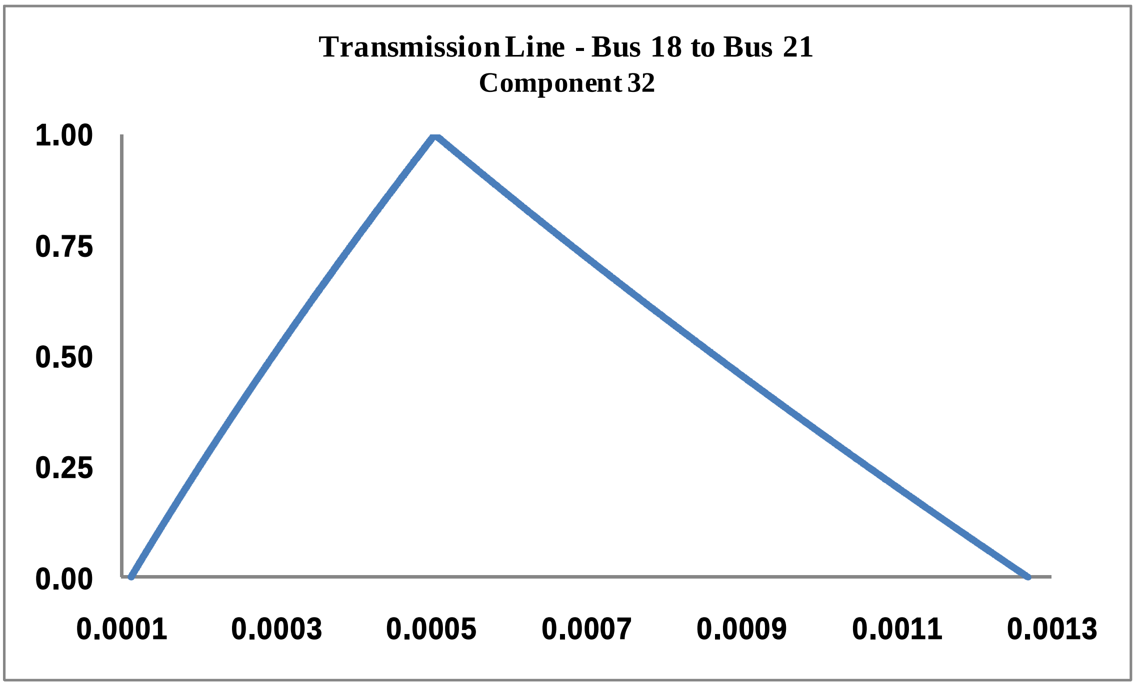

Transmission Line - Bus 15 to Bus 24
Component 27
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011

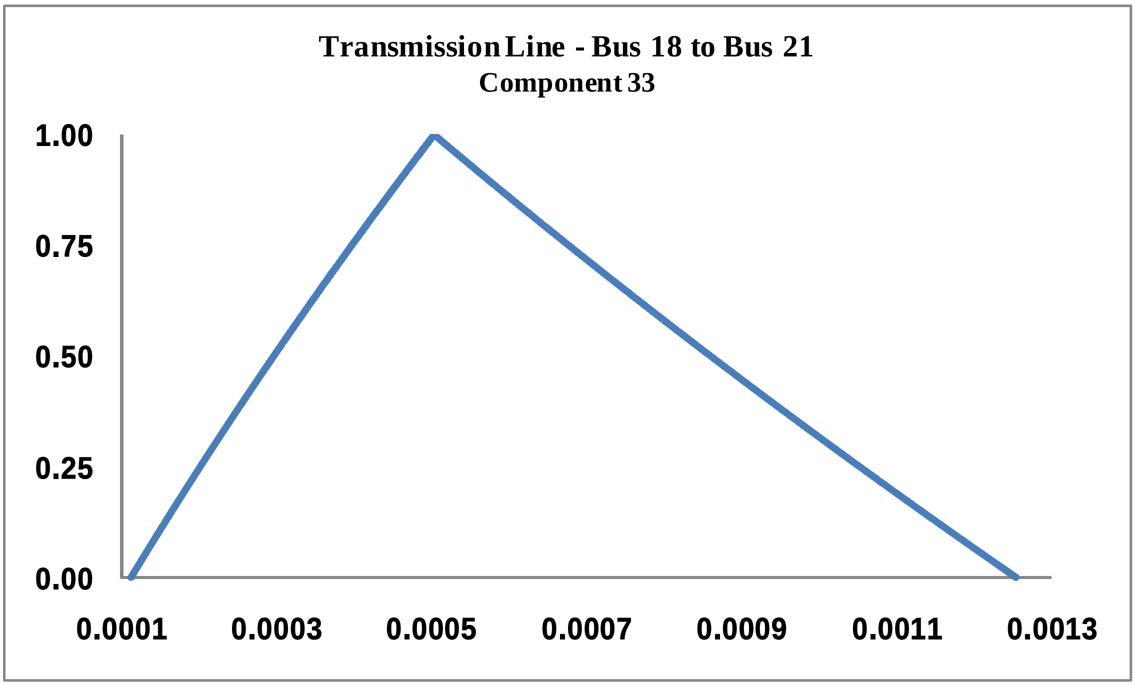

Transmission Line - Bus 16 to Bus 17
Component 28
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

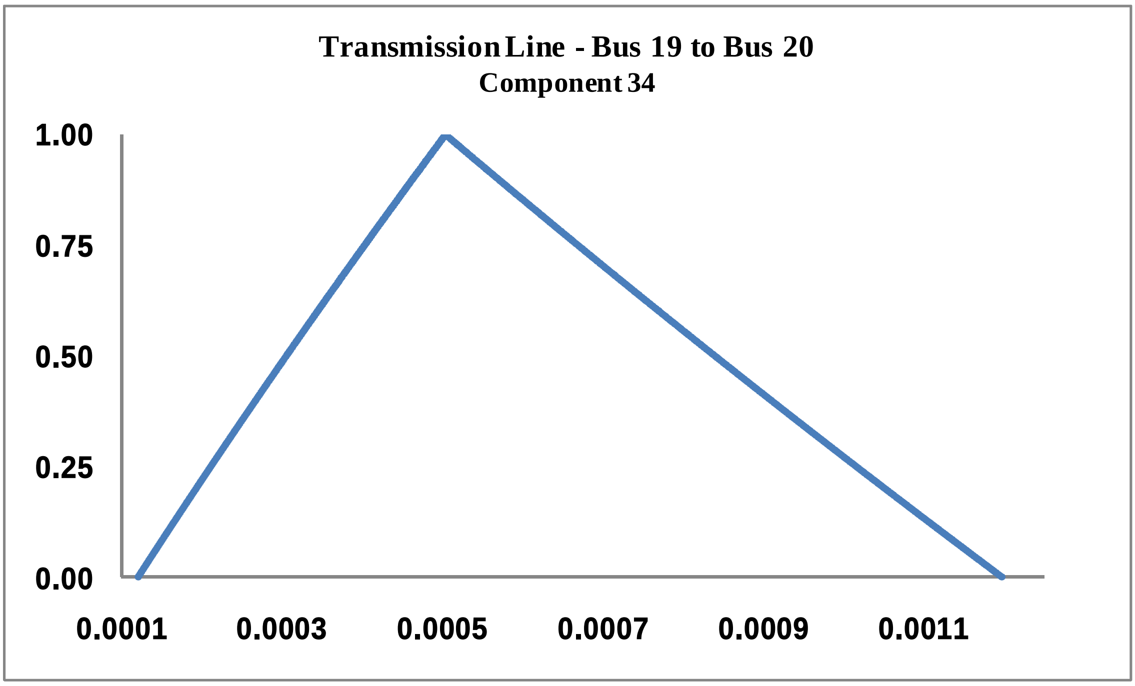

Transmission Line - Bus 16 to Bus 19
Component 29
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

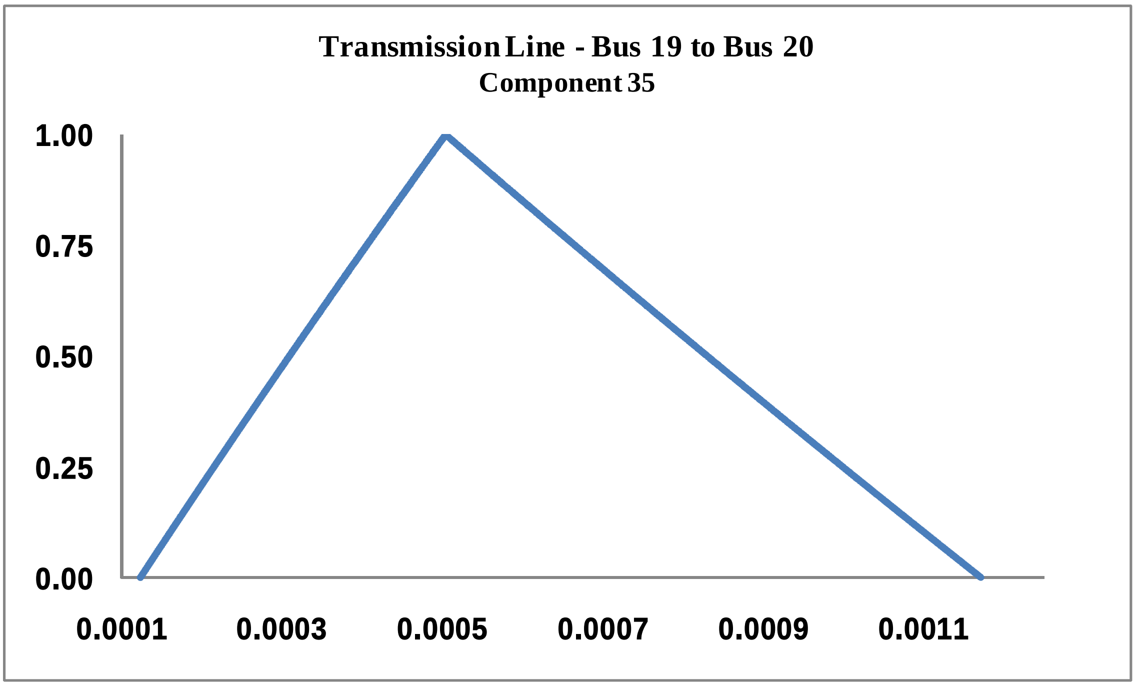

Transmission Line - Bus 17 to Bus 18
Component 30
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

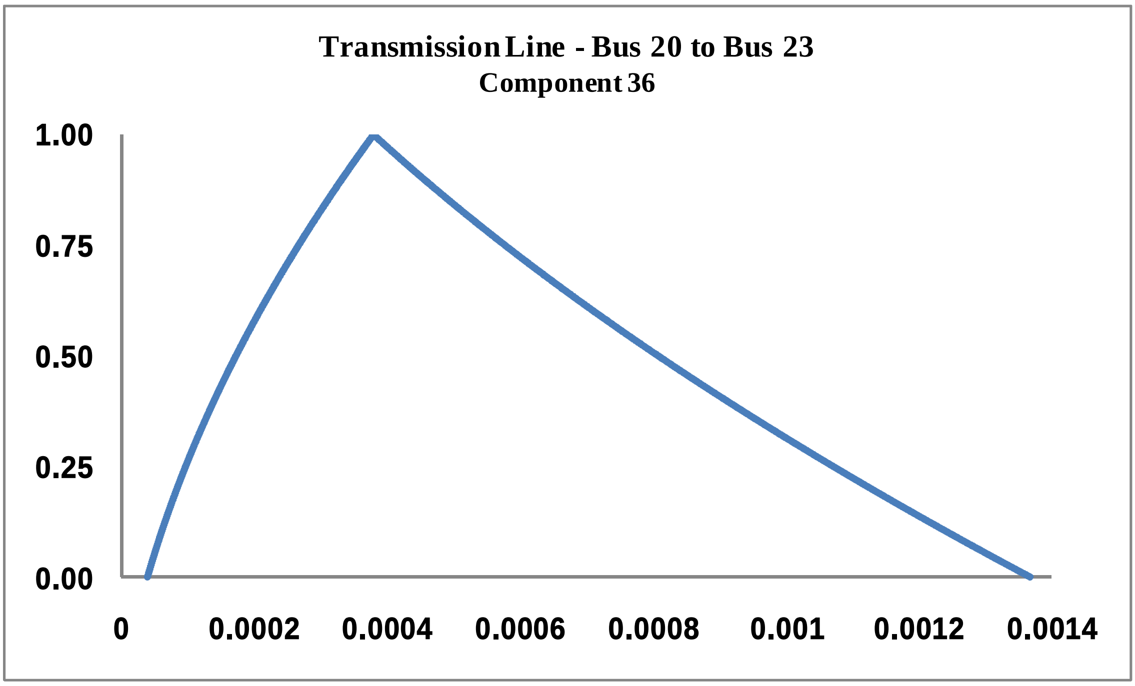

Transmission Line - Bus 17 to Bus 22
Component 31
1.00
0.75
0.50
0.25
0.00
0.00015
0.00035
0.00055
0.00075
0.00095
0.00115
0.00135

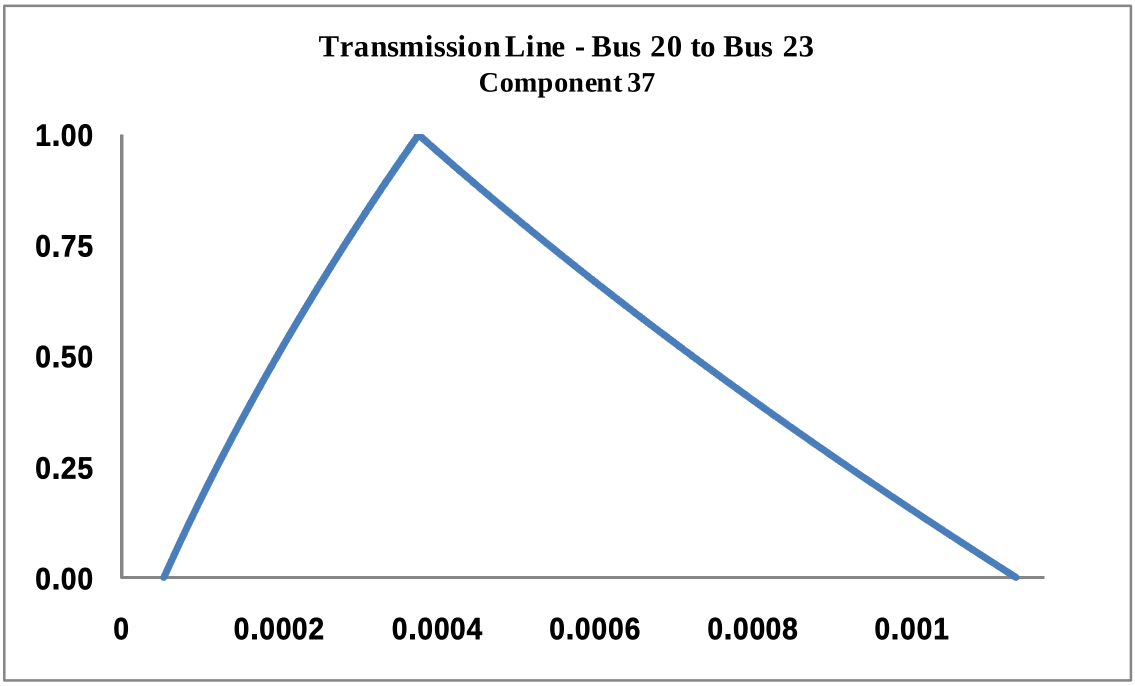

Transmission Line - Bus 18 to Bus 21
Component 32
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

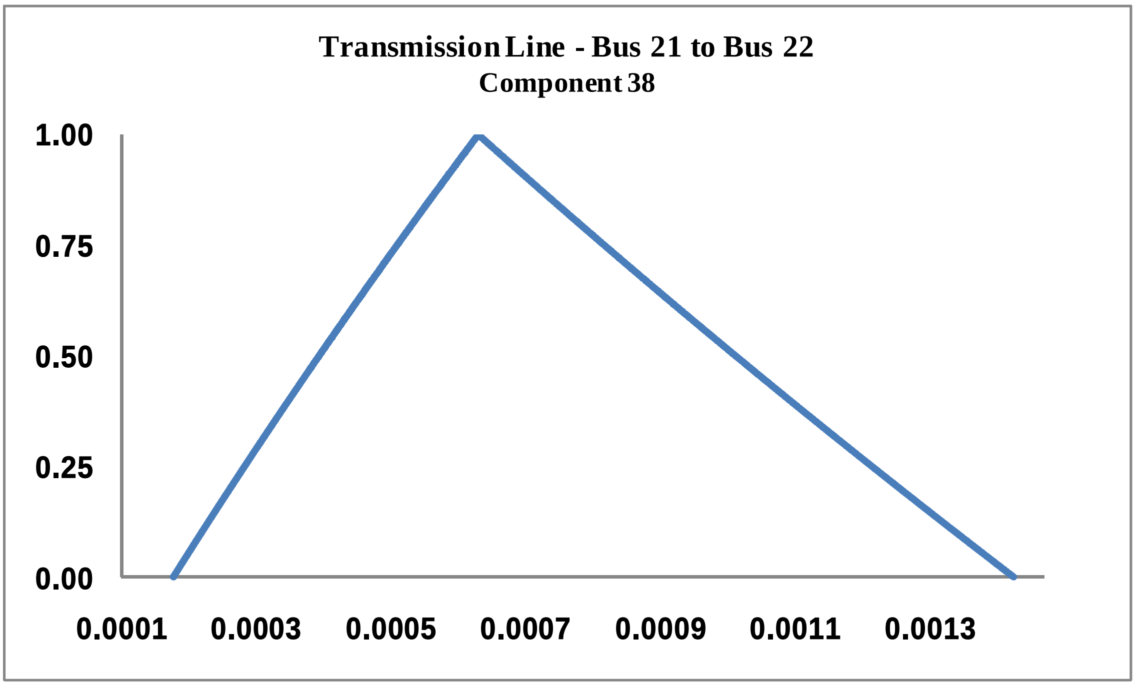

Transmission Line - Bus 18 to Bus 21
Component 33
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

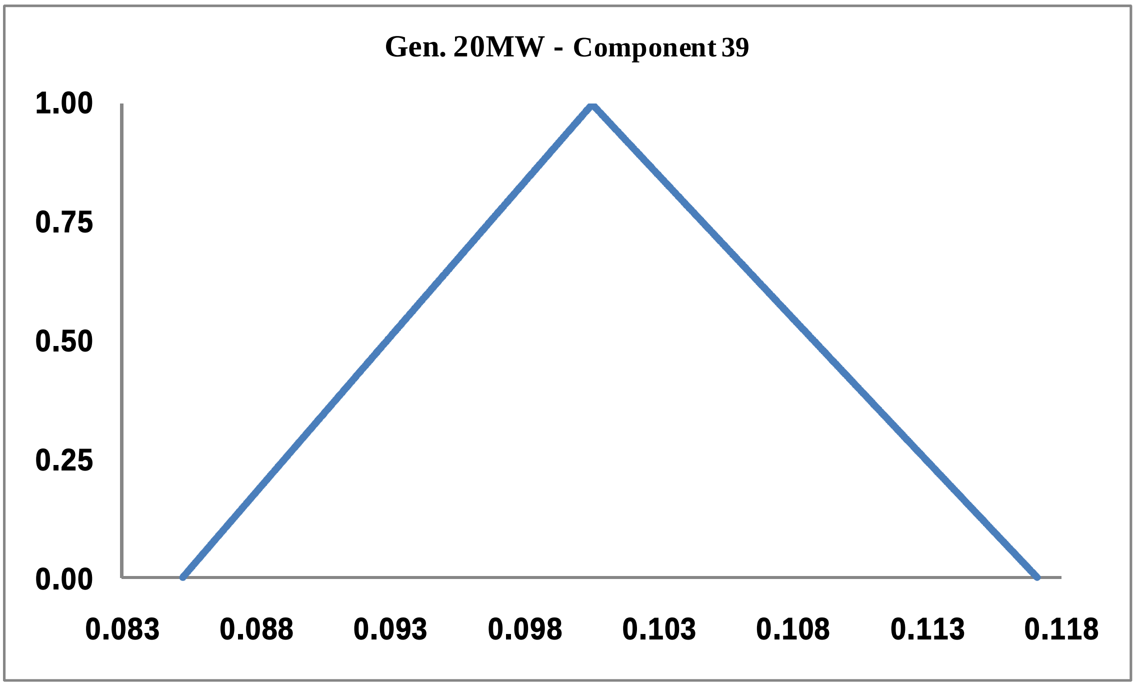

Transmission Line - Bus 19 to Bus 20
Component 34
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011

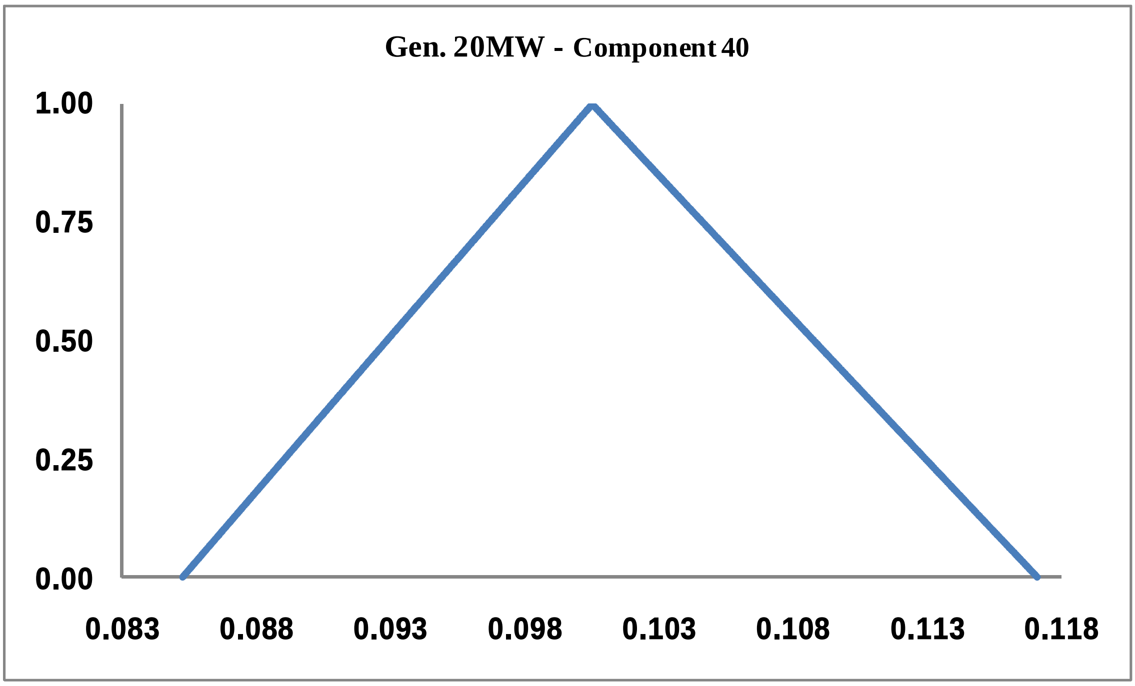

Transmission Line - Bus 19 to Bus 20
Component 35
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011

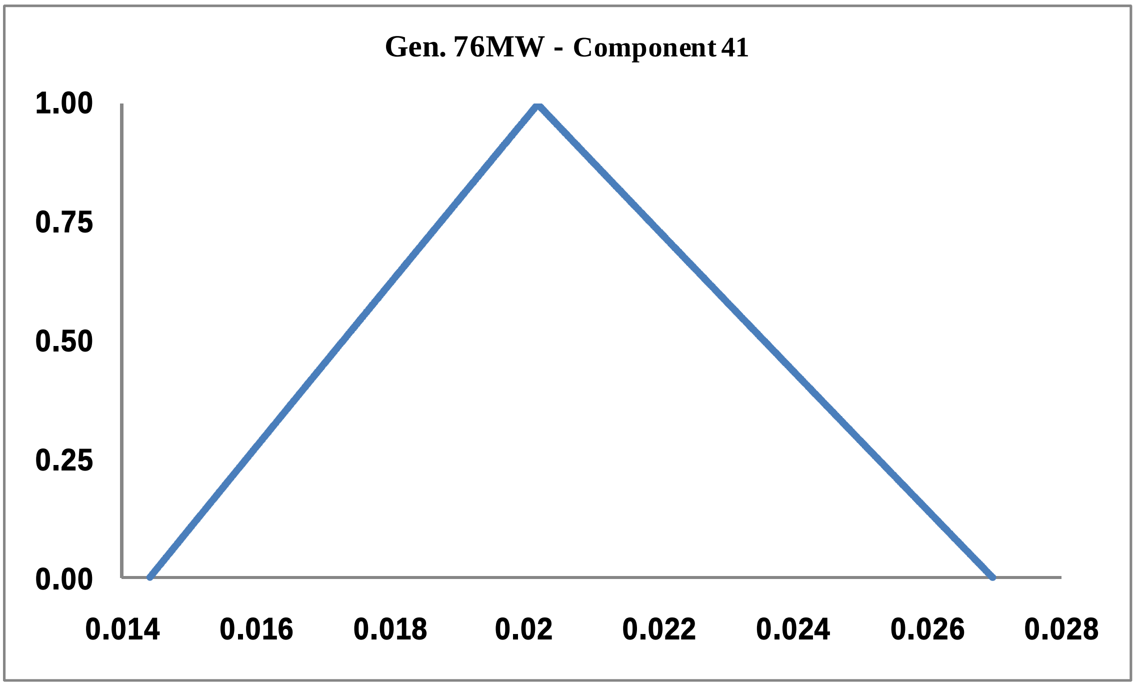

Transmission Line - Bus 20 to Bus 23
Component 36
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001
0.0012
0.0014

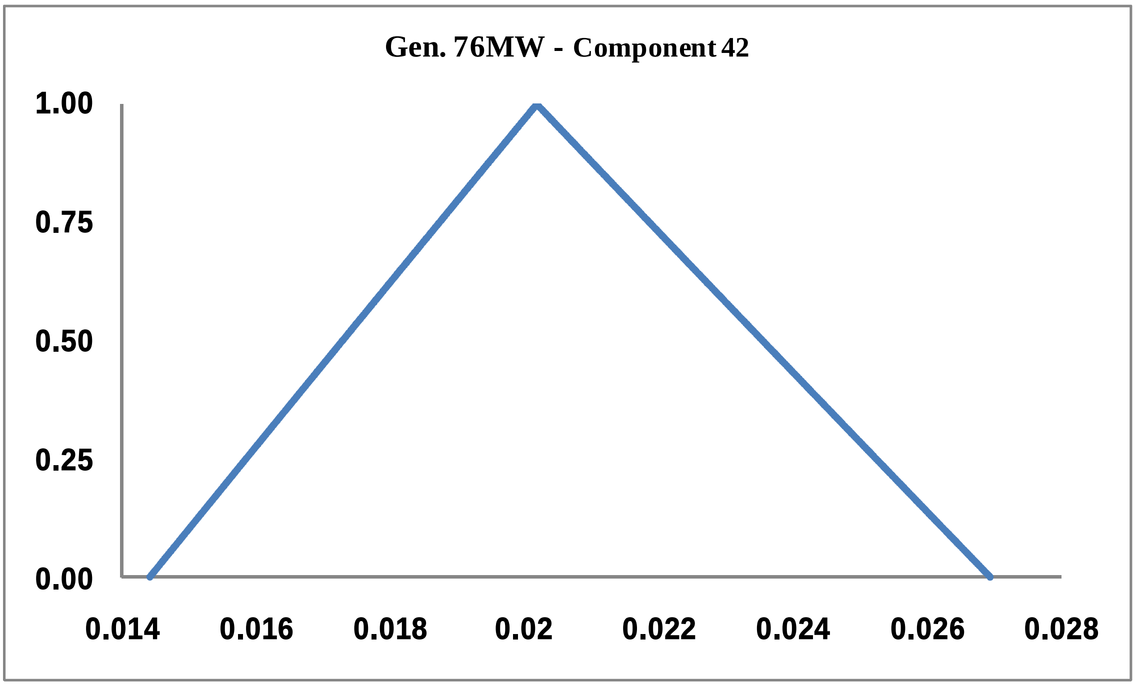

Transmission Line - Bus 20 to Bus 23
Component 37
1.00
0.75
0.50
0.25
0.00
0
0.0002
0.0004
0.0006
0.0008
0.001

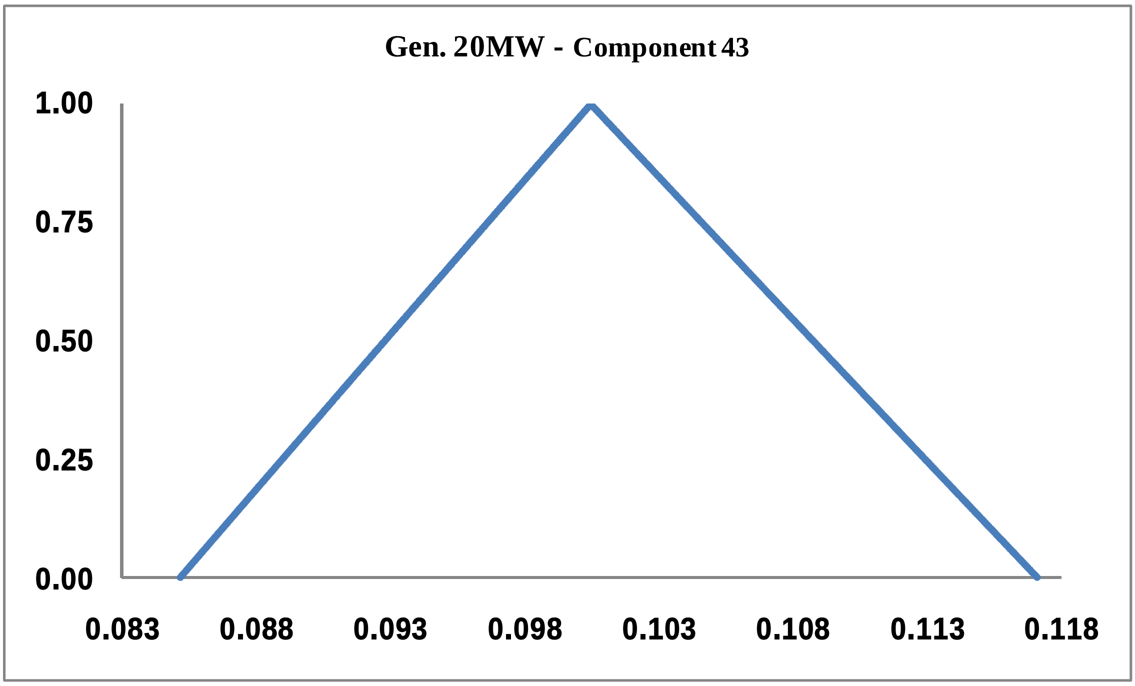

Transmission Line - Bus 21 to Bus 22
Component 38
1.00
0.75
0.50
0.25
0.00
0.0001
0.0003
0.0005
0.0007
0.0009
0.0011
0.0013

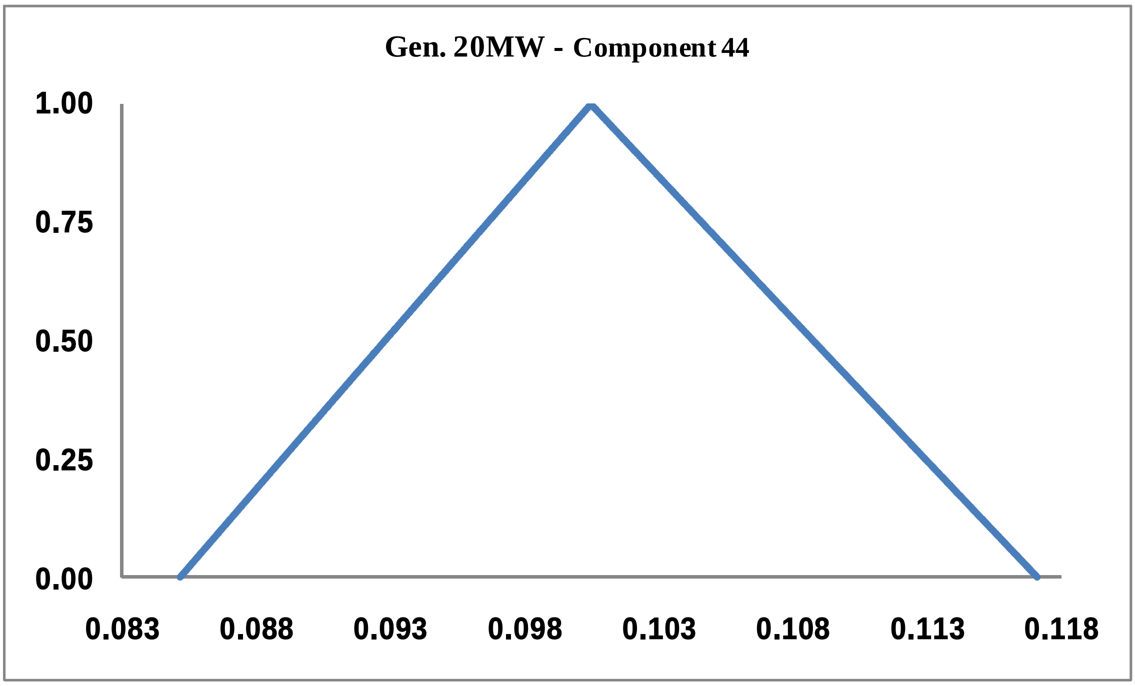

Gen. 20MW - Component 39
1.00
0.75
0.50
0.25
0.00
0.083
0.088
0.093
0.098
0.103
0.108
0.113
0.118

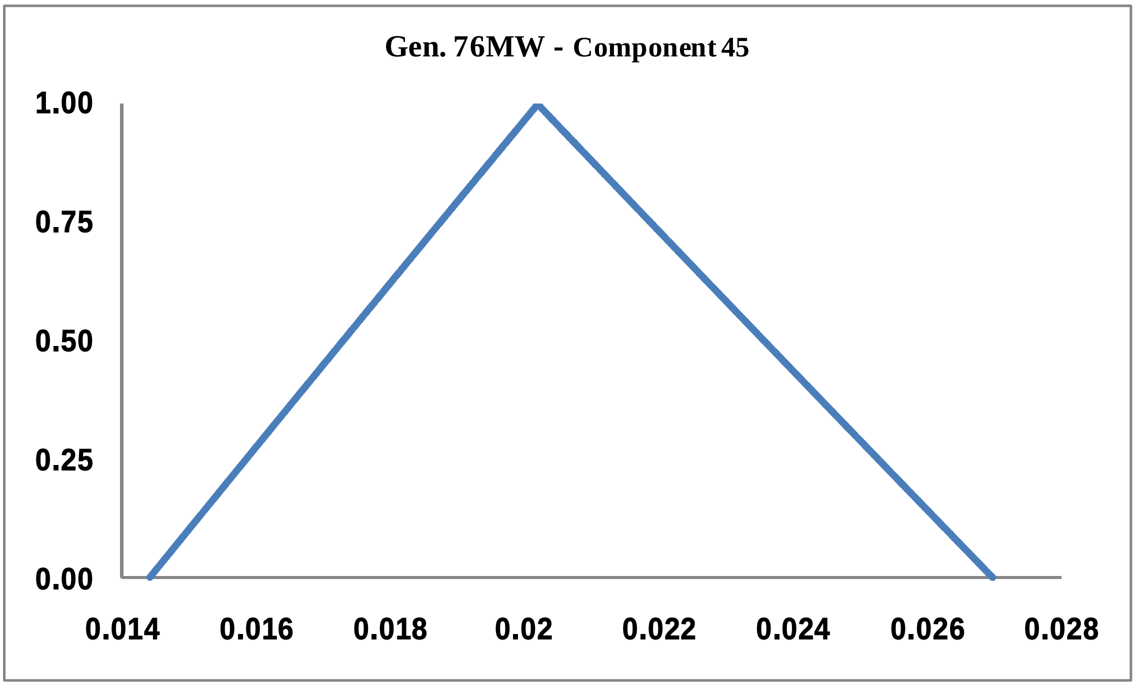

Gen. 20MW - Component 40
1.00
0.75
0.50
0.25
0.00
0.083
0.088
0.093
0.098
0.103
0.108
0.113
0.118

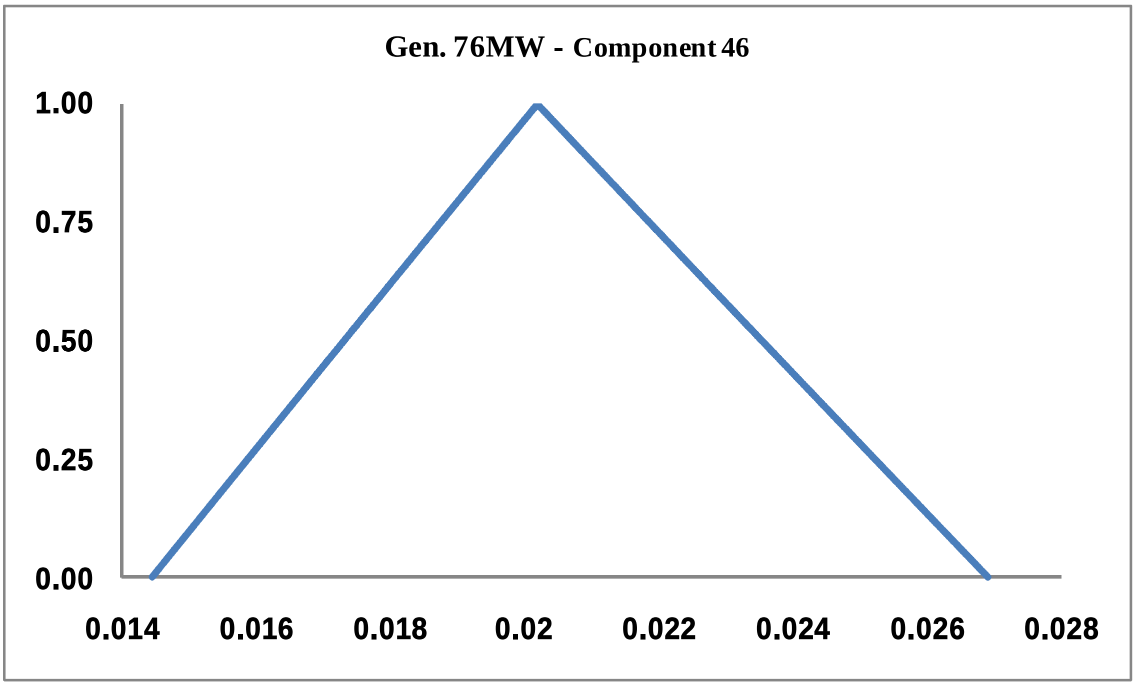

Gen. 76MW - Component 41
1.00
0.75
0.50
0.25
0.00
0.014
0.016
0.018
0.02
0.022
0.024
0.026
0.028

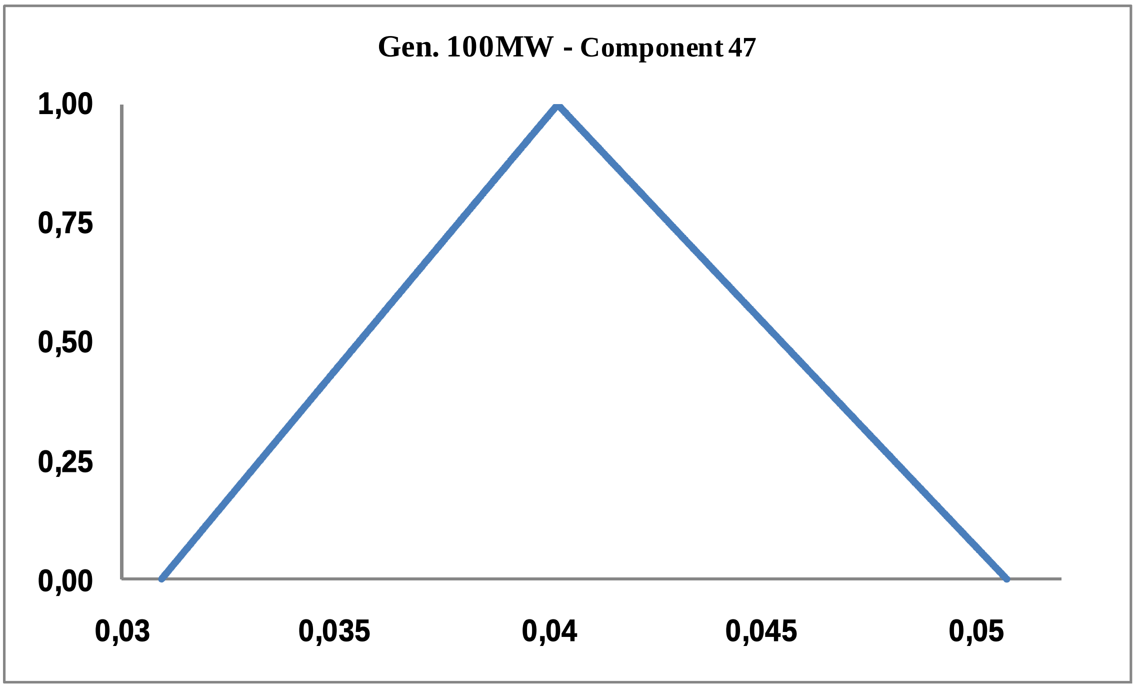

Gen. 76MW - Component 42
1.00
0.75
0.50
0.25
0.00
0.014
0.016
0.018
0.02
0.022
0.024
0.026
0.028

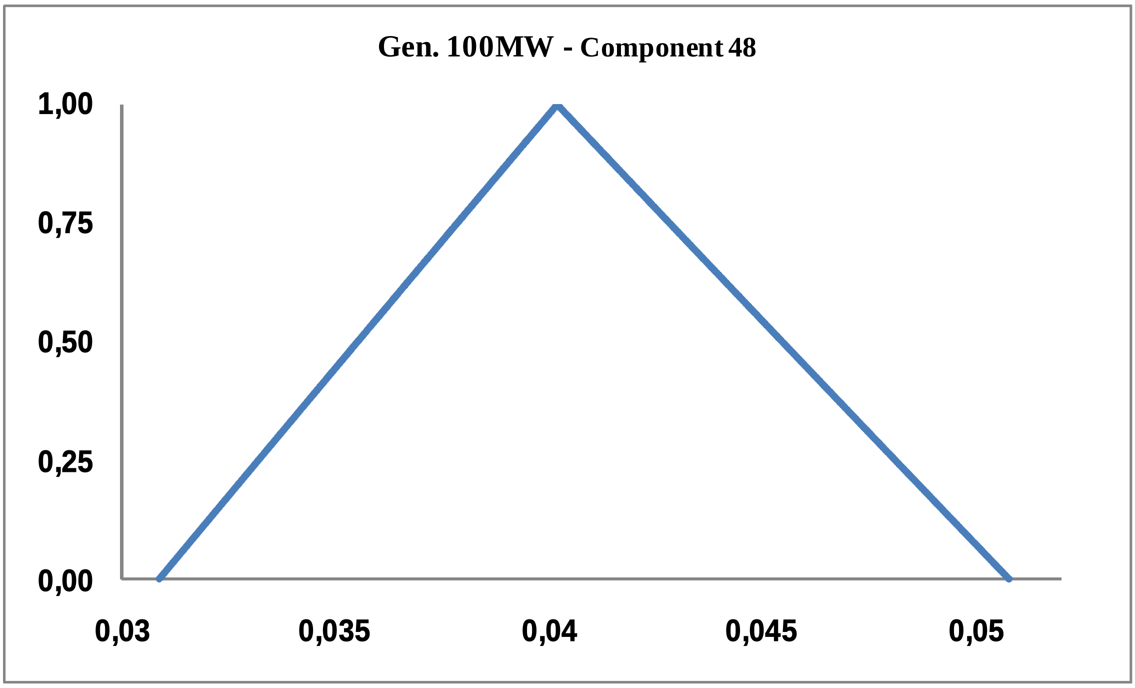

Gen. 20MW - Component 43
1.00
0.75
0.50
0.25
0.00
0.083
0.088
0.093
0.098
0.103
0.108
0.113
0.118

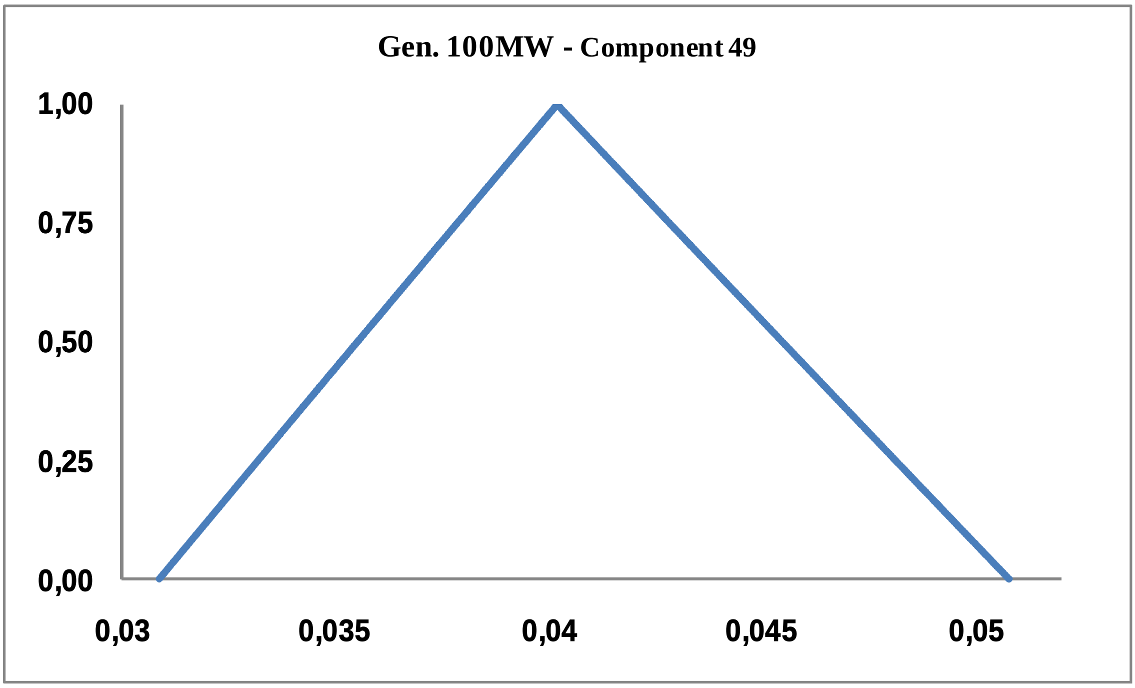

Gen. 20MW - Component 44
1.00
0.75
0.50
0.25
0.00
0.083
0.088
0.093
0.098
0.103
0.108
0.113
0.118

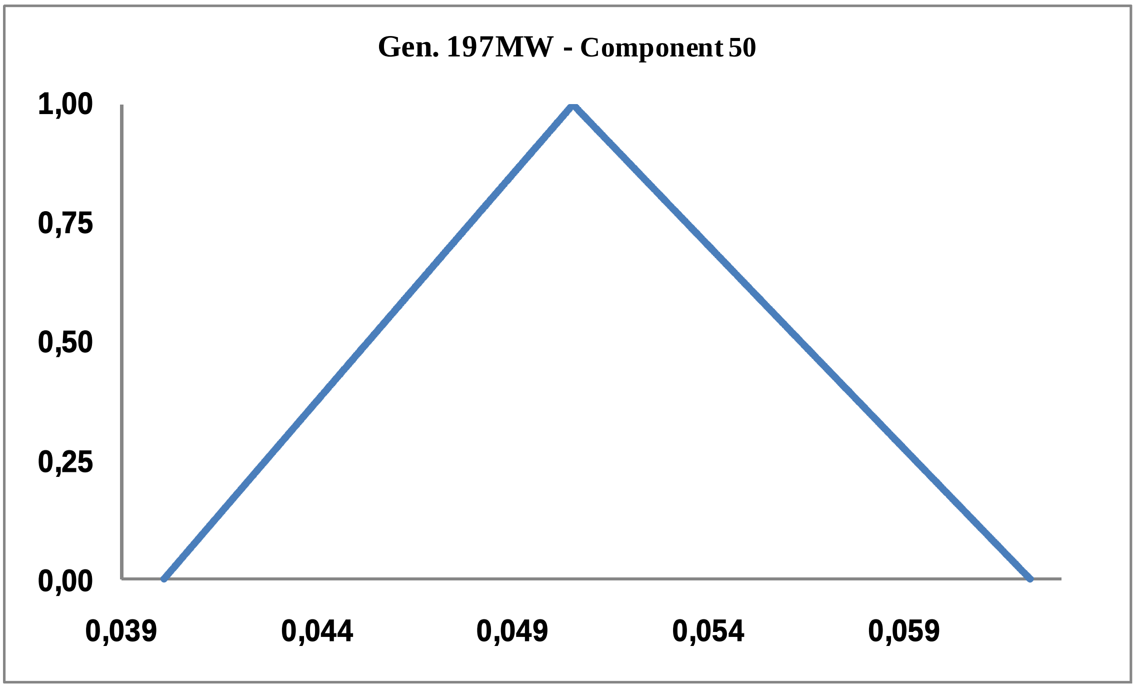

Gen. 76MW - Component 45
1.00
0.75
0.50
0.25
0.00
0.014
0.016
0.018
0.02
0.022
0.024
0.026
0.028

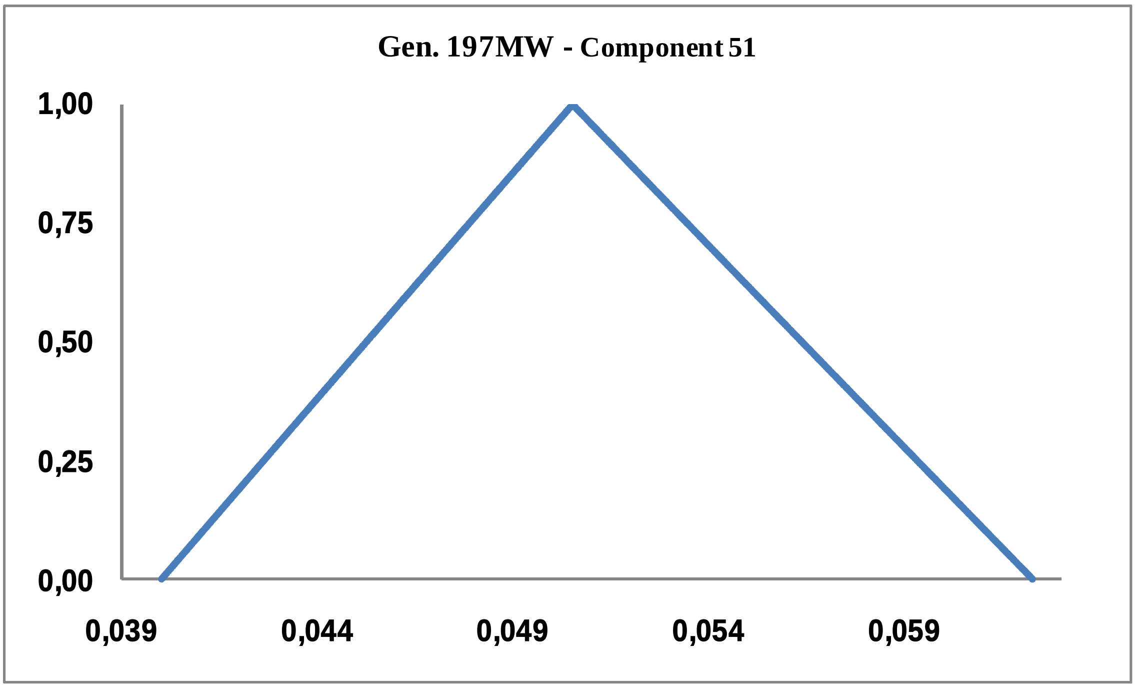

Gen. 76MW - Component 46
1.00
0.75
0.50
0.25
0.00
0.014
0.016
0.018
0.02
0.022
0.024
0.026
0.028

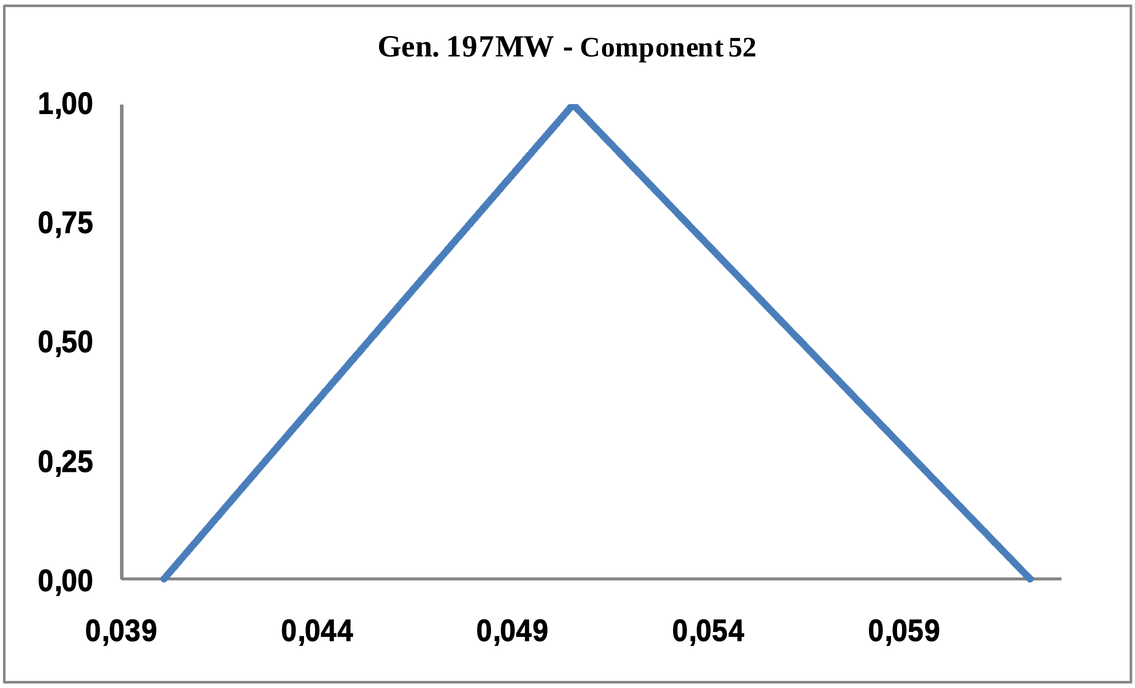

Gen. 100MW - Component 47
1,00
0,75
0,50
0,25
0,00
0,03
0,035
0,04
0,045
0,05

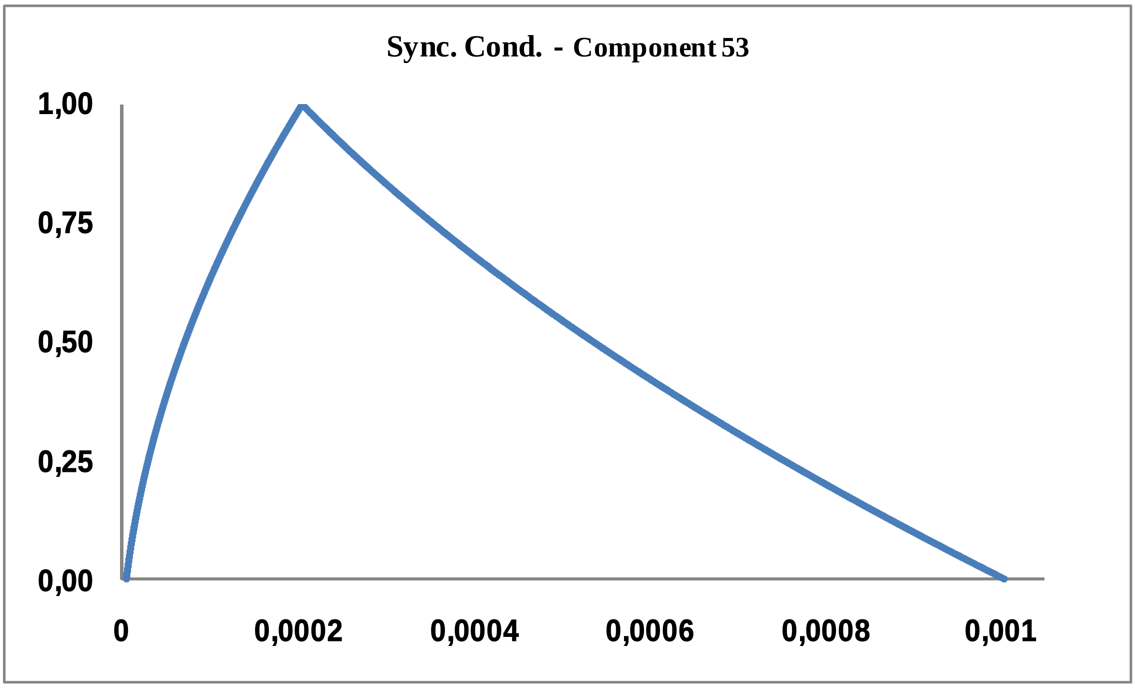

Gen. 100MW - Component 48
1,00
0,75
0,50
0,25
0,00
0,03
0,035
0,04
0,045
0,05

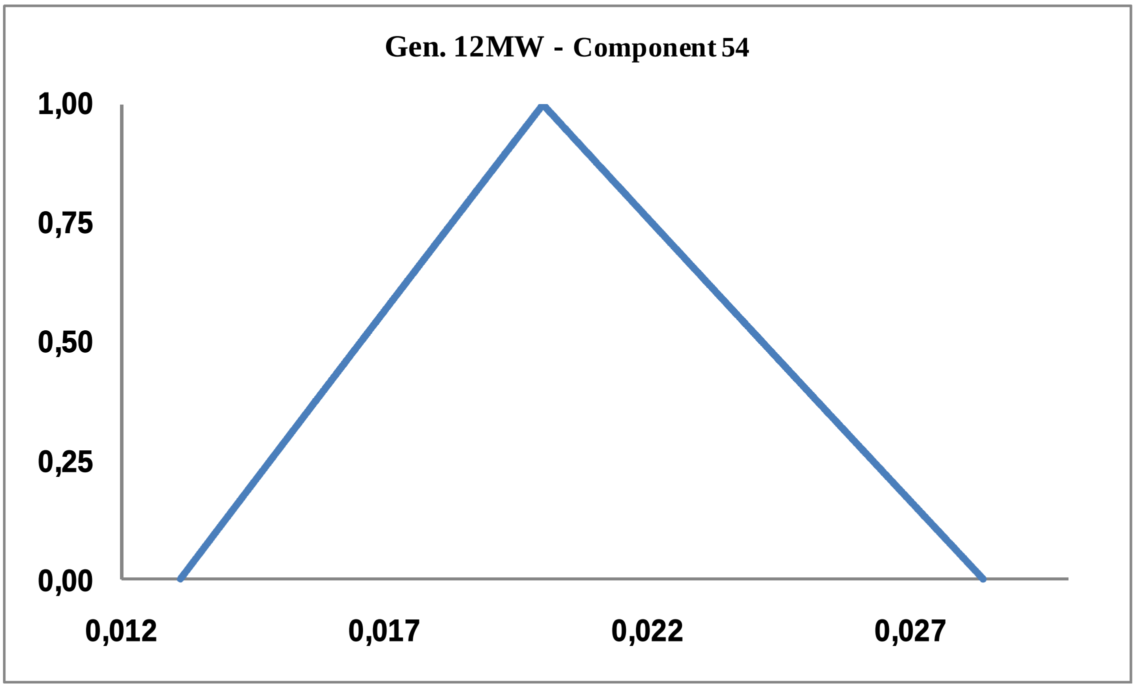

Gen. 100MW - Component 49
1,00
0,75
0,50
0,25
0,00
0,03
0,035
0,04
0,045
0,05

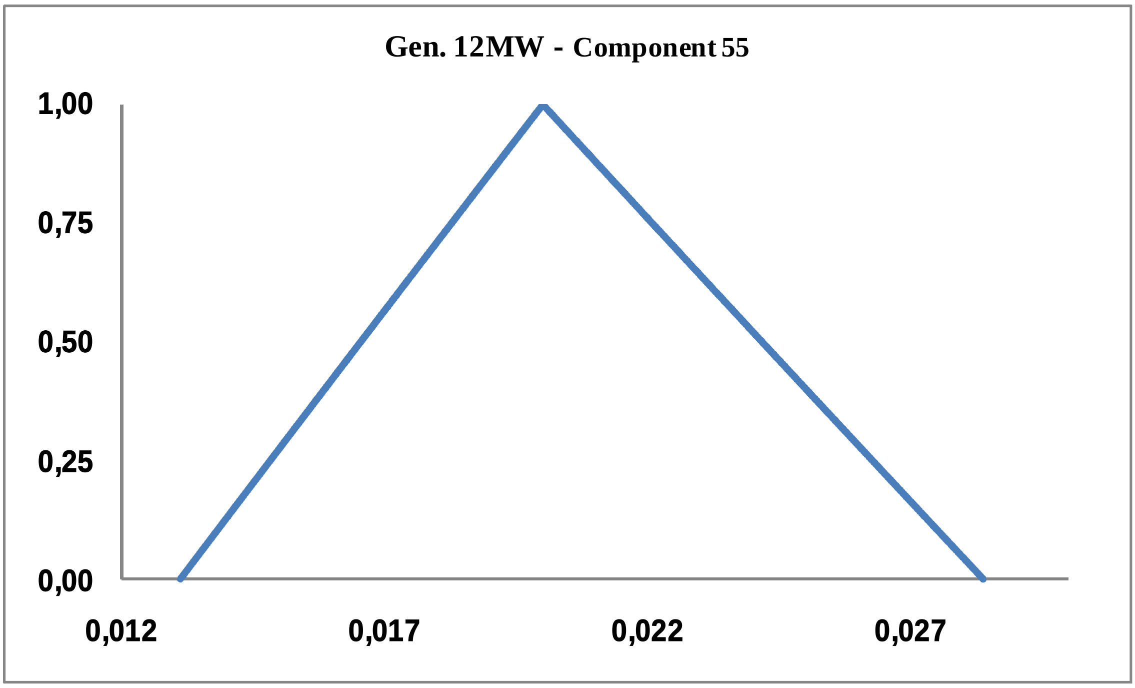

Gen. 197MW - Component 50
1,00
0,75
0,50
0,25
0,00
0,039
0,044
0,049
0,054
0,059

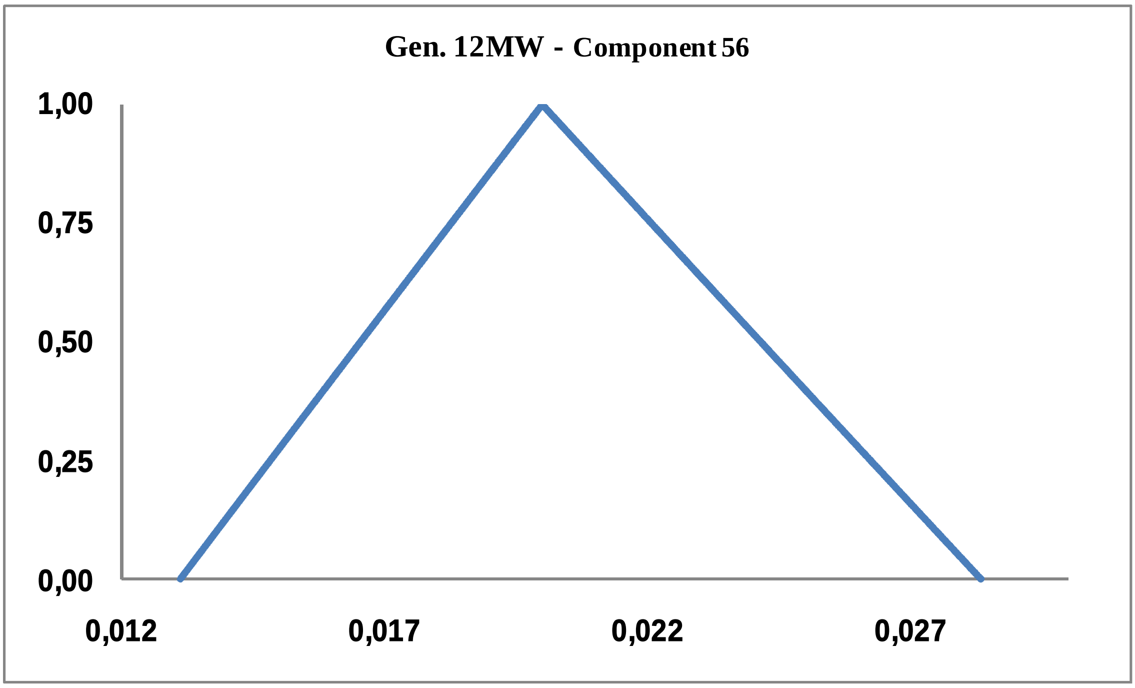

Gen. 197MW - Component 51
1,00
0,75
0,50
0,25
0,00
0,039
0,044
0,049
0,054
0,059

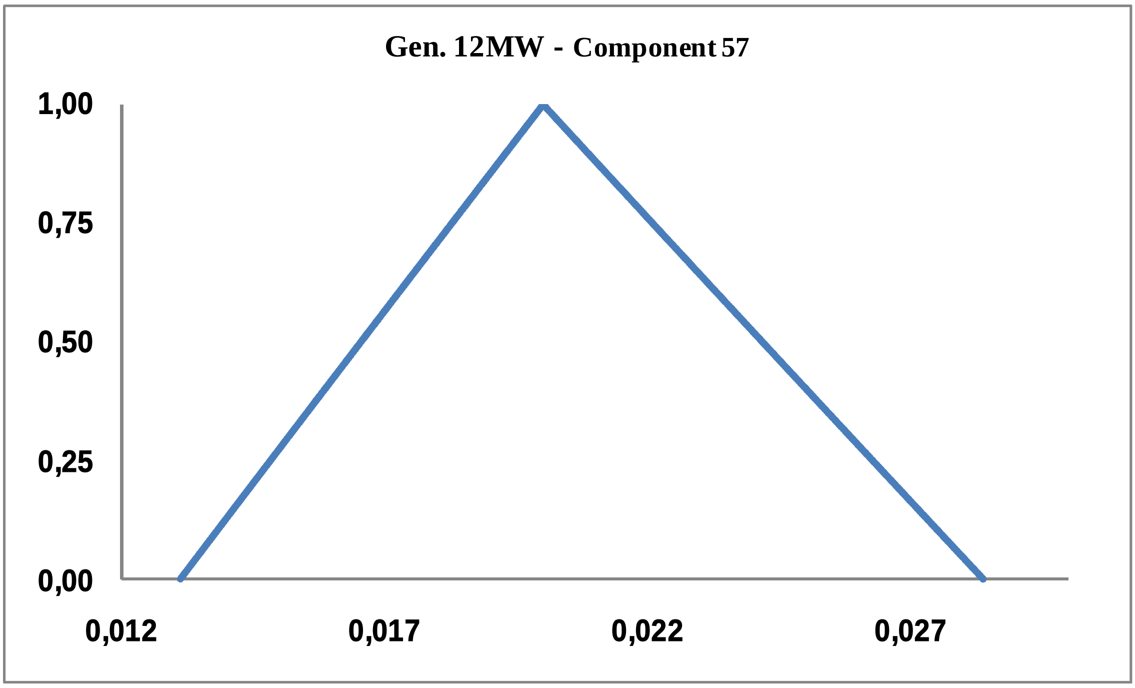

Gen. 197MW - Component 52
1,00
0,75
0,50
0,25
0,00
0,039
0,044
0,049
0,054
0,059

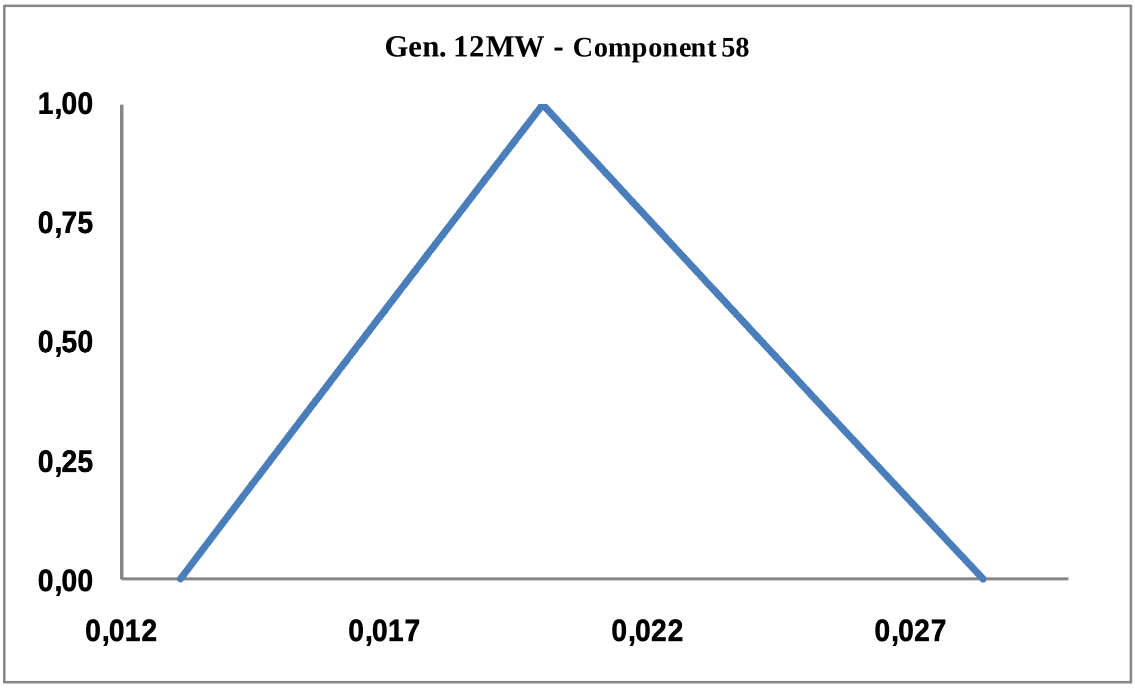

Sync. Cond. - Component 53
1,00
0,75
0,50
0,25
0,00
0
0,0002
0,0004
0,0006
0,0008
0,001

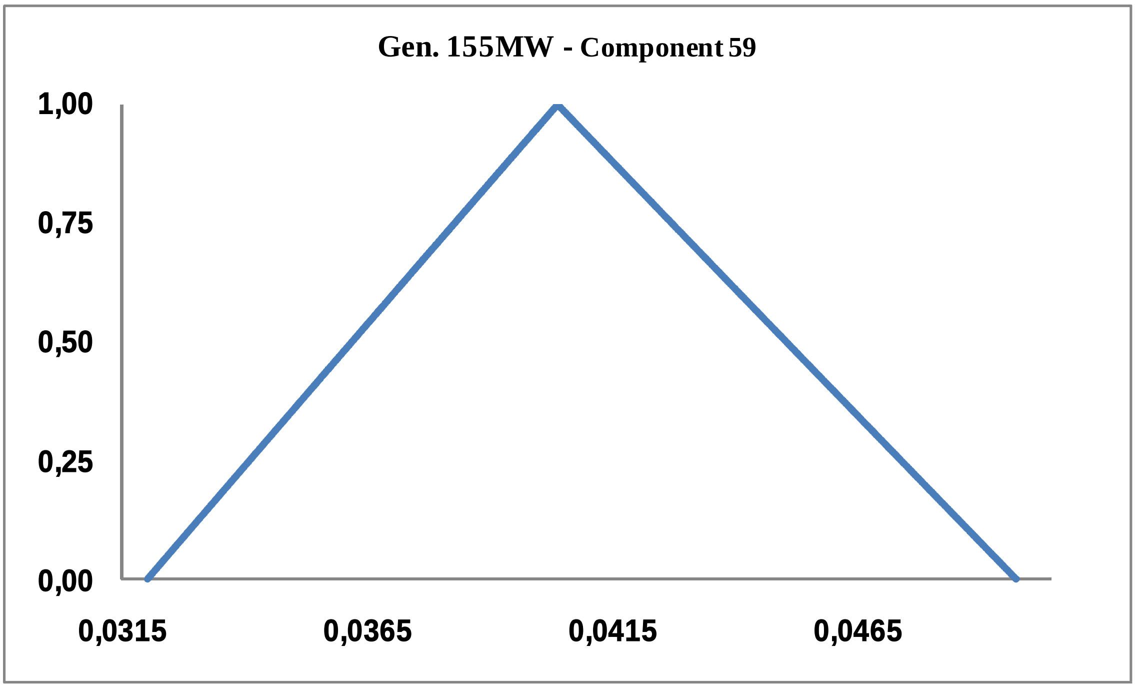

Gen. 12MW - Component 54
1,00
0,75
0,50
0,25
0,00
0,012
0,017
0,022
0,027

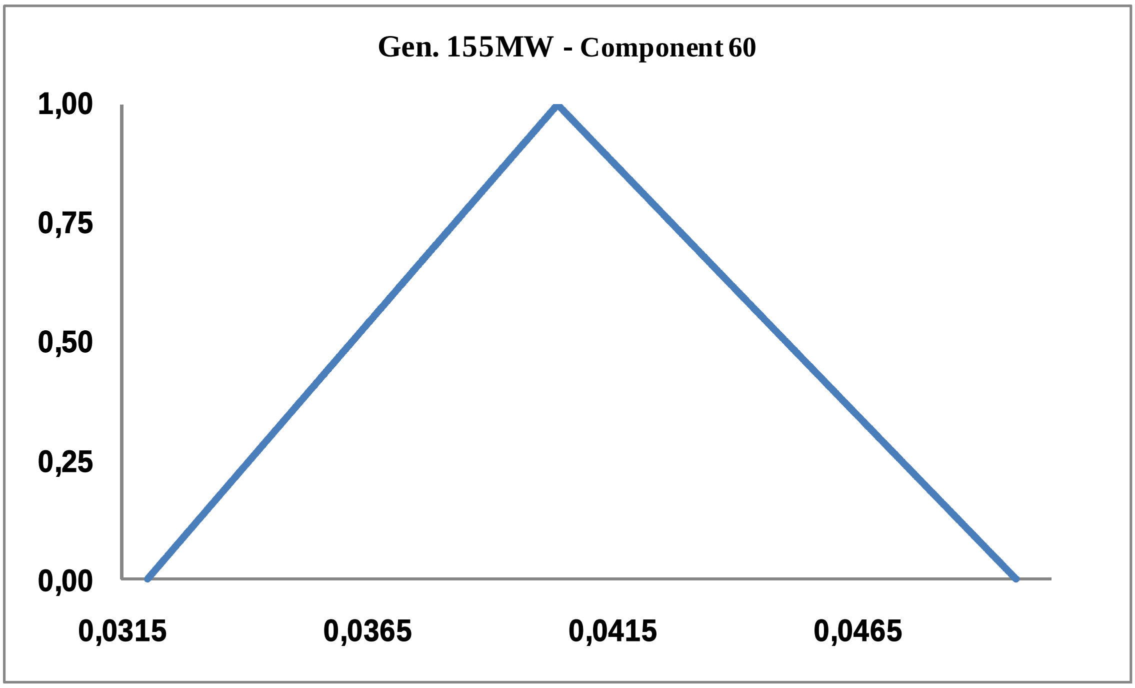

Gen. 12MW - Component 55
1,00
0,75
0,50
0,25
0,00
0,012
0,017
0,022
0,027

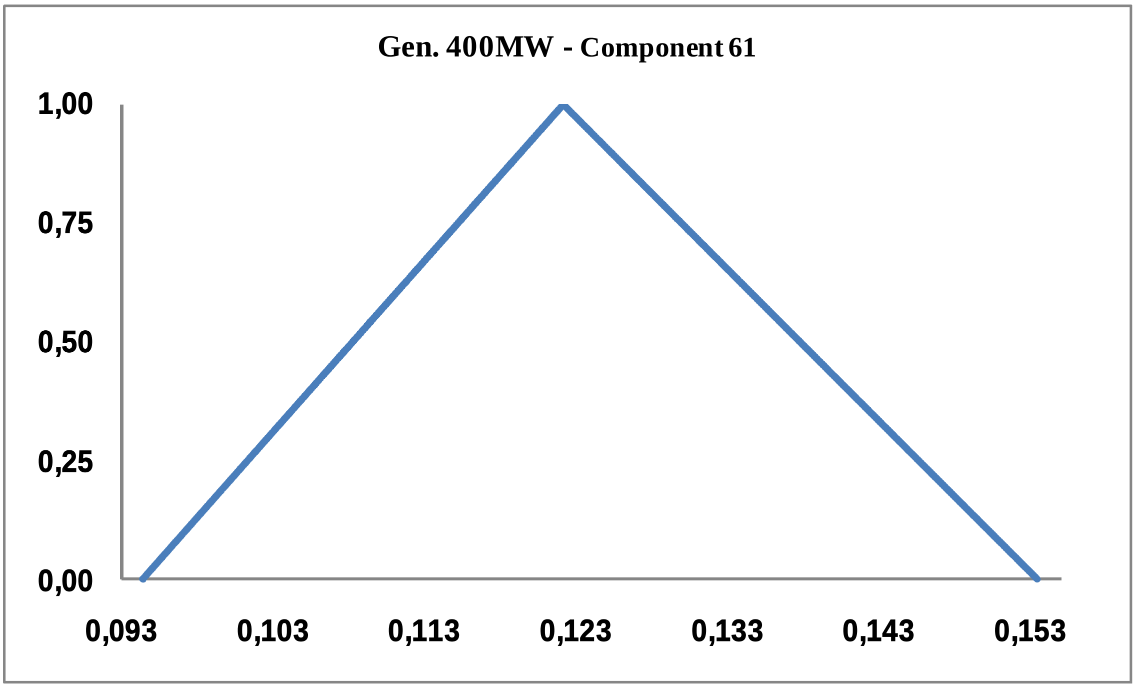

Gen. 12MW - Component 56
1,00
0,75
0,50
0,25
0,00
0,012
0,017
0,022
0,027

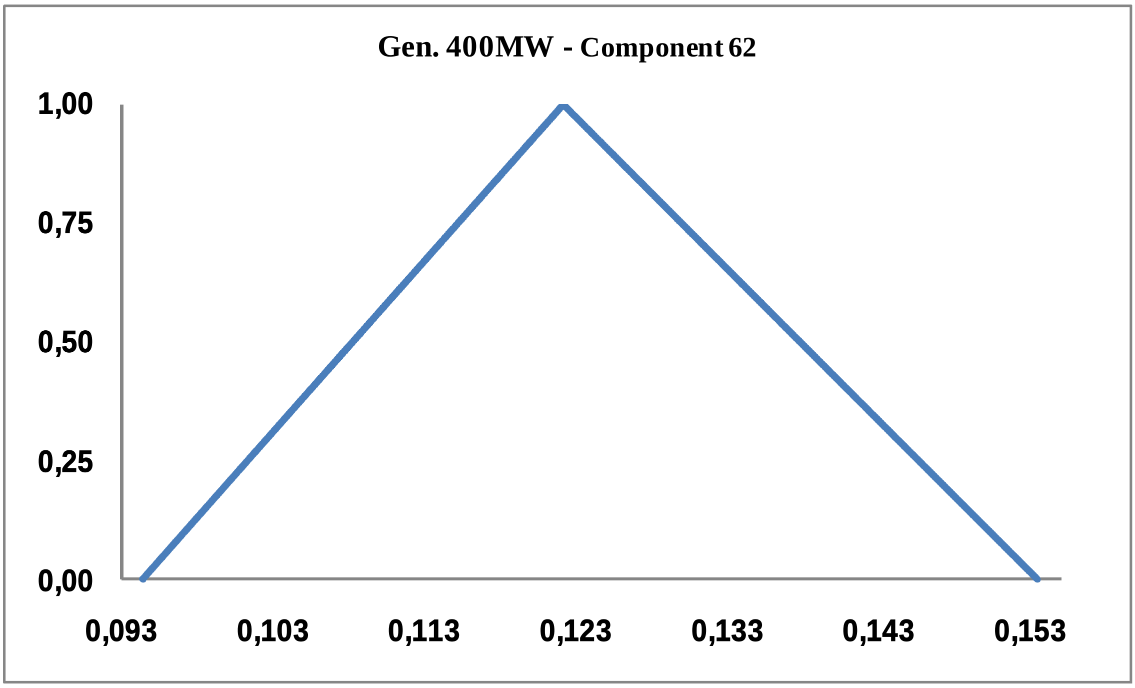

Gen. 12MW - Component 57
1,00
0,75
0,50
0,25
0,00
0,012
0,017
0,022
0,027

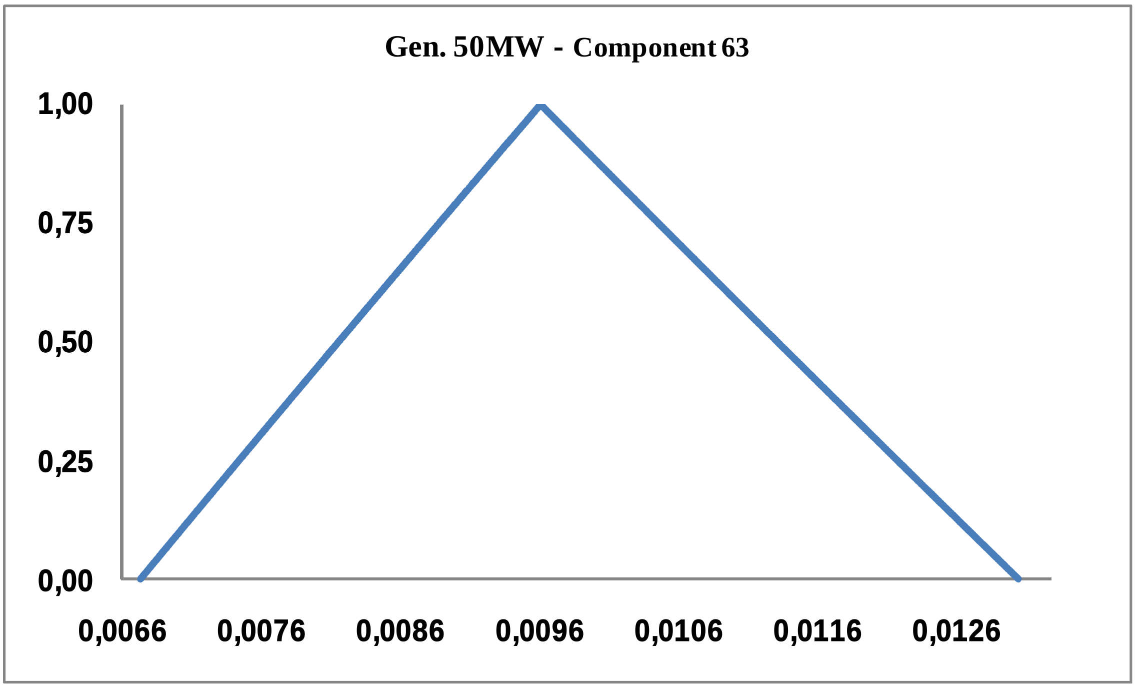

Gen. 12MW - Component 58
1,00
0,75
0,50
0,25
0,00
0,012
0,017
0,022
0,027

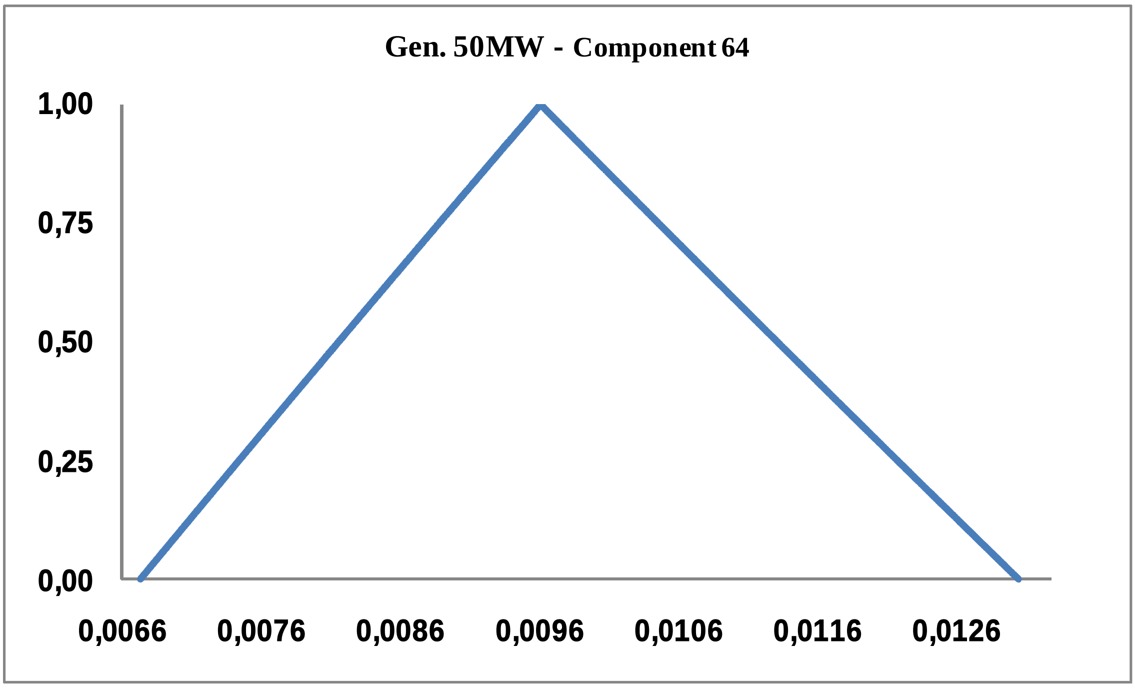

Gen. 155MW - Component 59
1,00
0,75
0,50
0,25
0,00
0,0315
0,0365
0,0415
0,0465

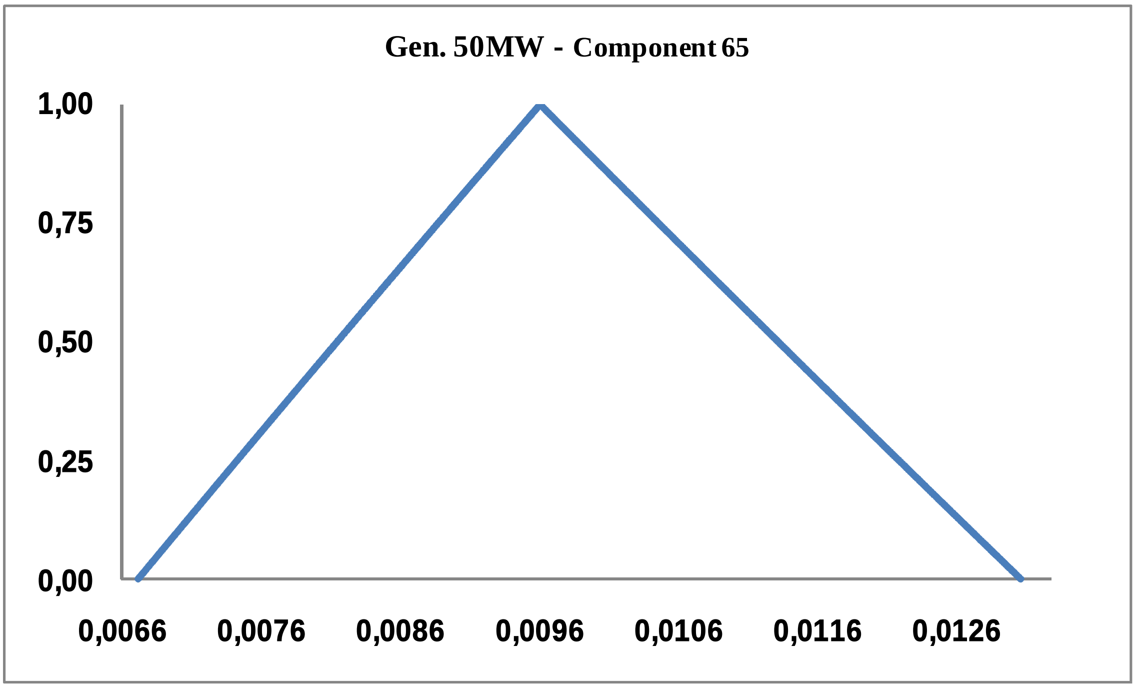

Gen. 155MW - Component 60
1,00
0,75
0,50
0,25
0,00
0,0315
0,0365
0,0415
0,0465

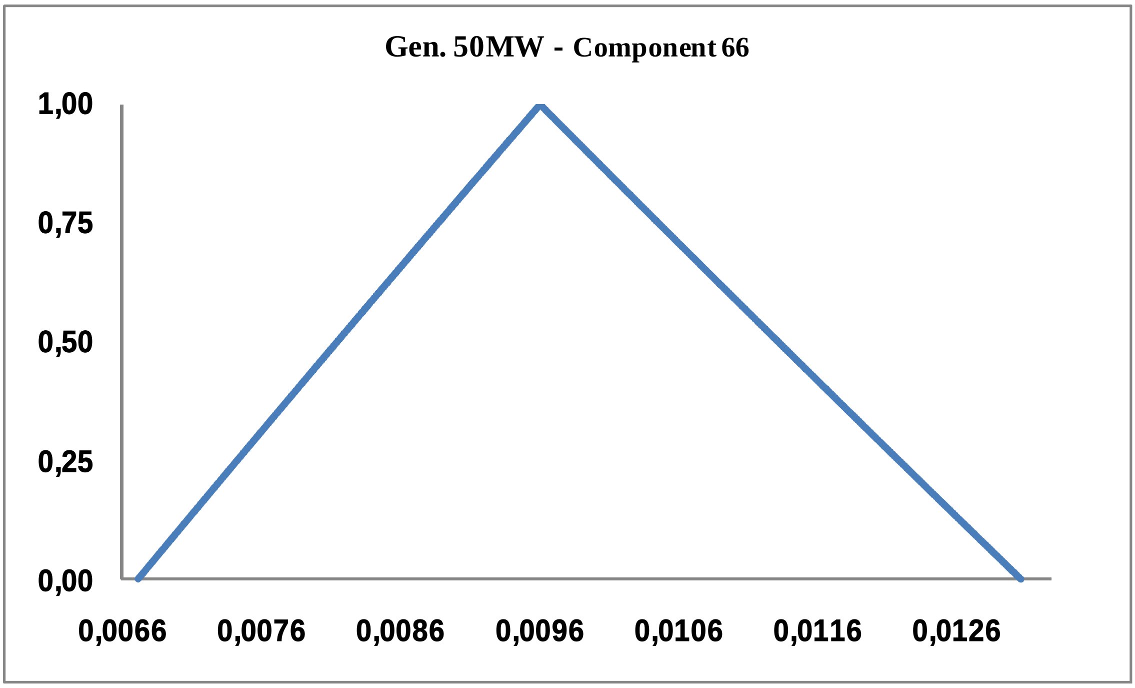

Gen. 400MW - Component 61
1,00
0,75
0,50
0,25
0,00
0,093
0,103
0,113
0,123
0,133
0,143
0,153

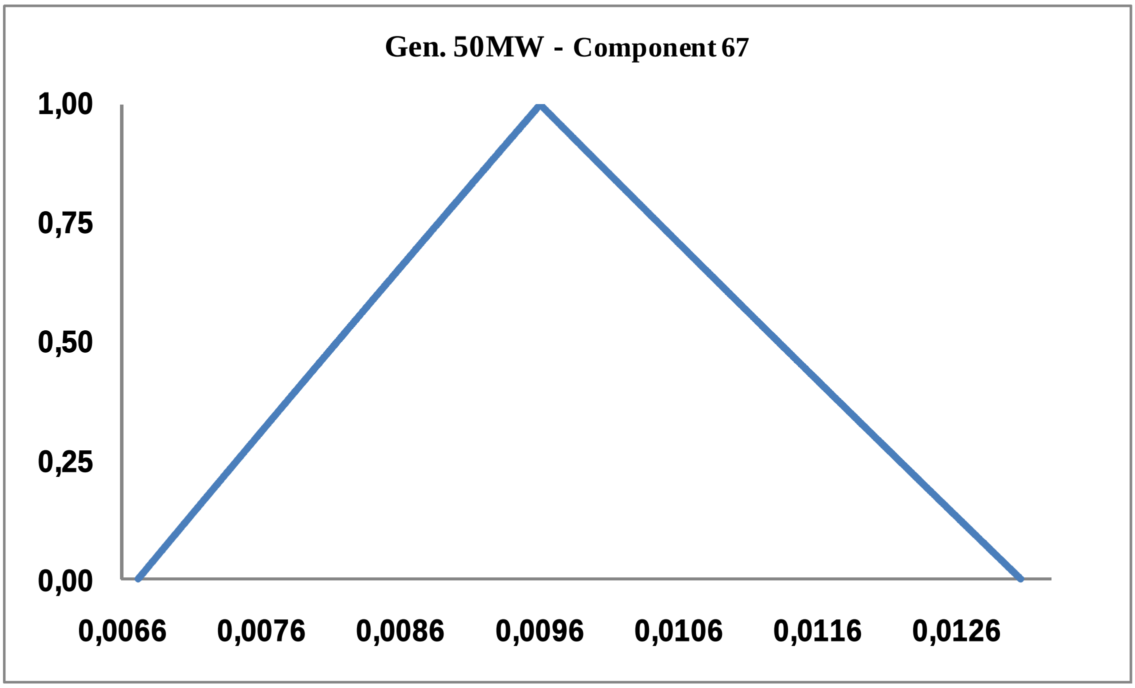

Gen. 400MW - Component 62
1,00
0,75
0,50
0,25
0,00
0,093
0,103
0,113
0,123
0,133
0,143
0,153

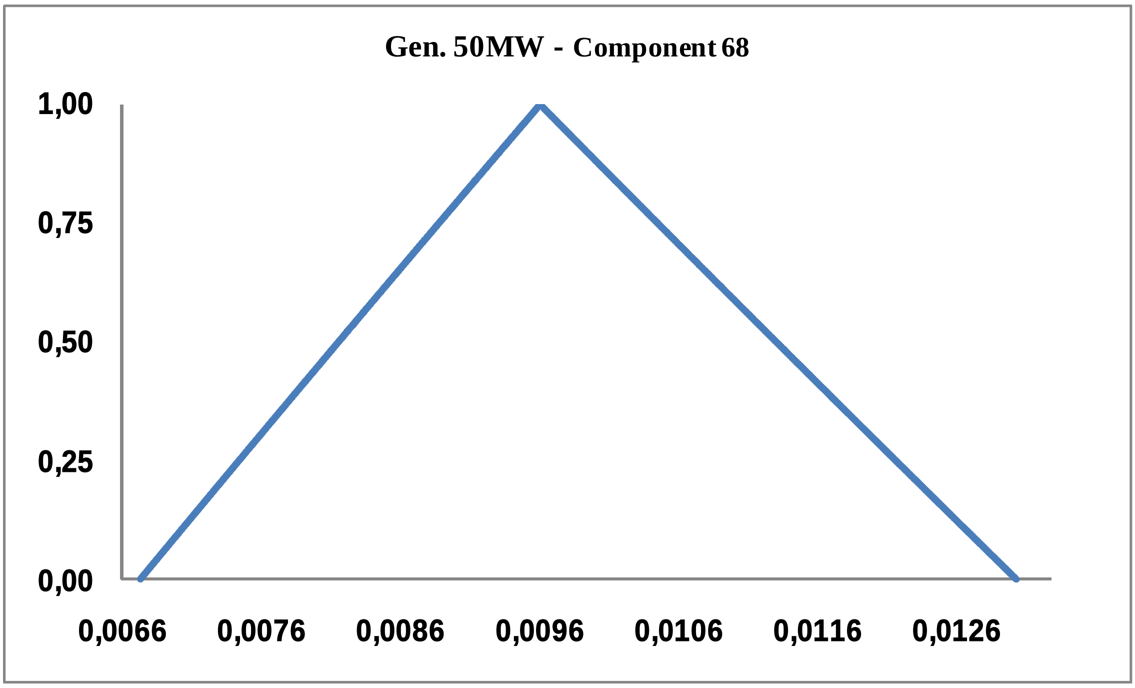

Gen. 50MW - Component 63
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126

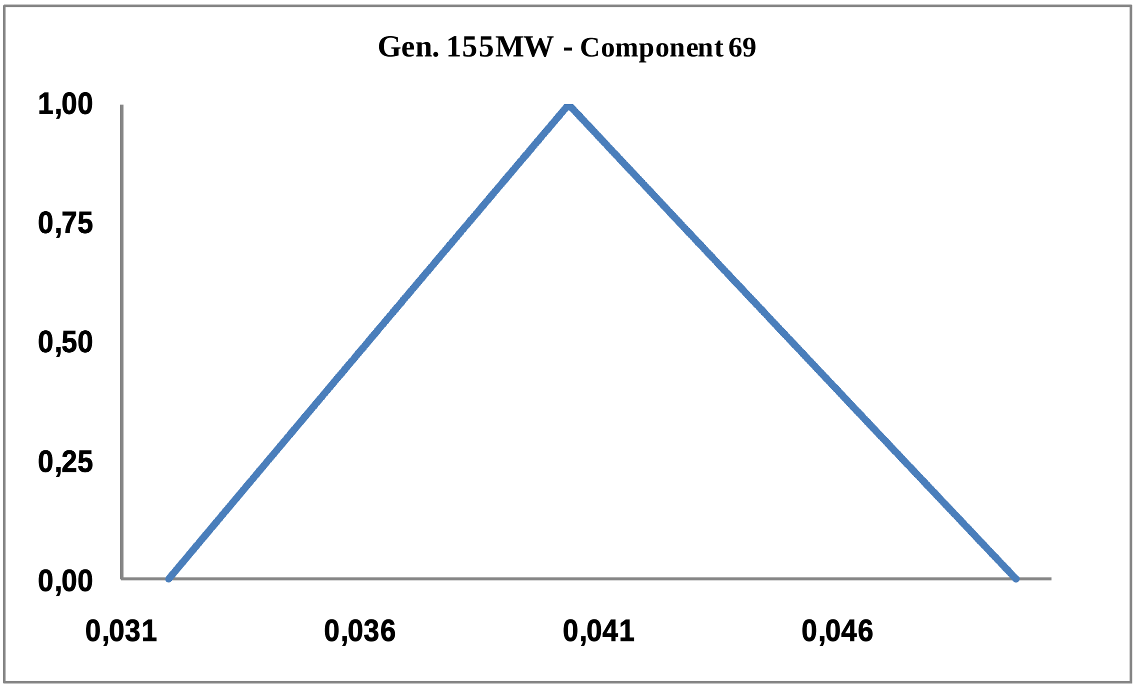

Gen. 50MW - Component 64
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126

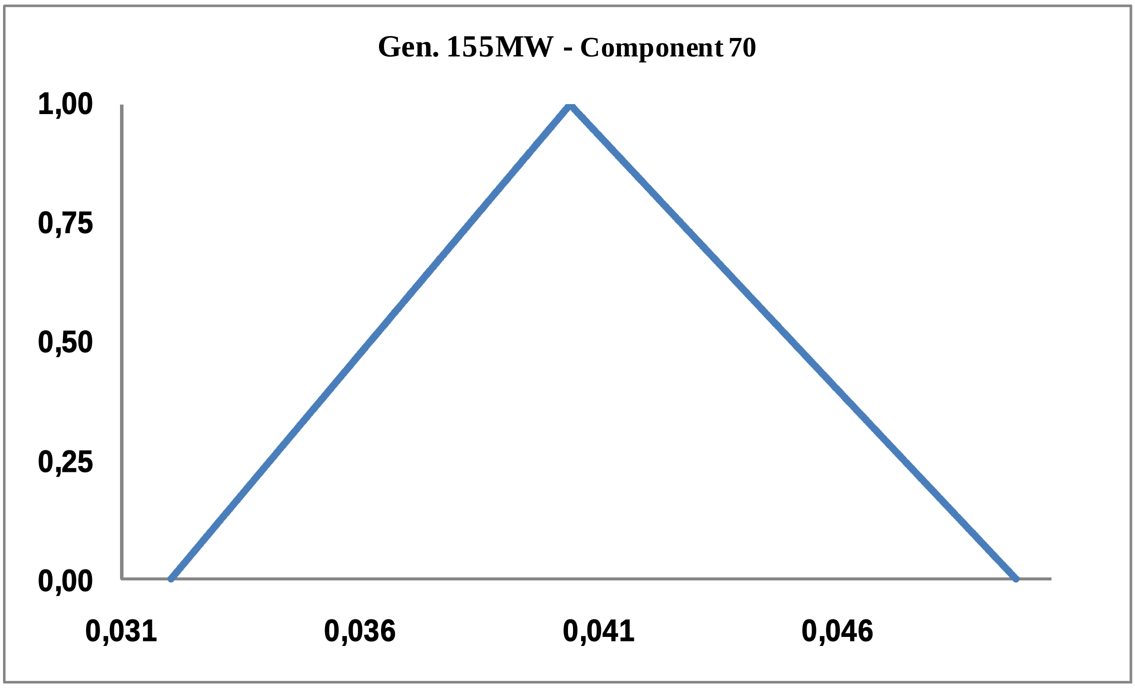

Gen. 50MW - Component 65
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126

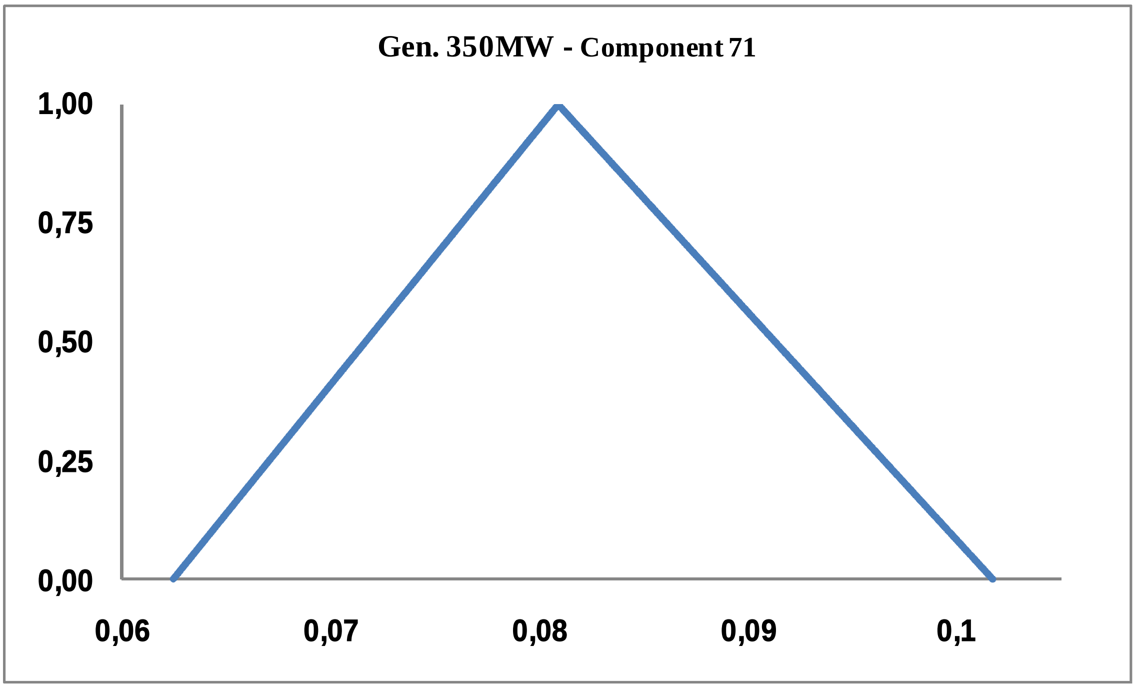

Gen. 50MW - Component 66
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126


Gen. 50MW - Component 67
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126


Gen. 50MW - Component 68
1,00
0,75
0,50
0,25
0,00
0,0066
0,0076
0,0086
0,0096
0,0106
0,0116
0,0126


Gen. 155MW - Component 69
1,00
0,75
0,50
0,25
0,00
0,031
0,036
0,041
0,046


Gen. 155MW - Component 70
1,00
0,75
0,50
0,25
0,00
0,031
0,036
0,041
0,046


Gen. 350MW - Component 71
1,00
0,75
0,50
0,25
0,00
0,06
0,07
0,08
0,09
0,1

Annex 7

State ID	State No.	Component Number								Problem Type	Component / Bus	Value
P1	727	10	0	0	0	0	0	0	0	VLLV	B6	0.856100
P2	733	5	0	0	0	0	0	0	0	VULV	B6	1.113400
P3	1515	11	0	0	0	0	0	0	0	NC	-	-
P4	2357	47	48	49	0	0	0	0	0	VLLV	B7 B8	0.653600 0.715900
P5	2533	49	61	62	71	0	0	0	0	OVL	C18	511.080000
P6	2538	47	61	62	71	0	0	0	0	OVL	C18	511.080000
P7	2673	10	62	0	0	0	0	0	0	VLLV	B6	0.856100
P8	2832	5	39	0	0	0	0	0	0	VULV	B6	1.113500
P9	2846	48	61	62	71	0	0	0	0	OVL	C18	511.080000
P10	2963	61	62	70	71	0	0	0	0	OVL	C18	513.760000
P11	2965	60	61	62	71	0	0	0	0	OVL	C18	540.020000
P12	3038	10	40	0	0	0	0	0	0	VLLV	B6	0.856100
P13	3127	61	62	69	71	0	0	0	0	OVL	C18	513.760000
P14	3129	59	61	62	71	0	0	0	0	OVL	C18	540.330000
P15	3219	10	39	0	0	0	0	0	0	VLLV	B6	0.856100
P16	3315	5	40	0	0	0	0	0	0	VULV	B6	1.113500
P17	3506	10	44	0	0	0	0	0	0	VLLV	B6	0.856100
P18	3512	5	71	0	0	0	0	0	0	VULV	B6	1.115000
P19	3871	10	43	0	0	0	0	0	0	VLLV	B6	0.856100
P20	3876	5	61	0	0	0	0	0	0	VULV	B6	1.113500
P21	3877	5	43	0	0	0	0	0	0	VULV	B6	1.113500
P22	4027	5	62	0	0	0	0	0	0	VULV	B6	1.113400
P23	4177	59	60	61	62	0	0	0	0	OVL	C18	521.880000
P24	4362	10	71	0	0	0	0	0	0	VLLV	B6	0.856100
P25	4624	46	61	62	71	0	0	0	0	OVL	C18	508.930000
P26	4789	10	50	0	0	0	0	0	0	VLLV	B6	0.856100
P27	4795	5	52	0	0	0	0	0	0	VULV	B6	1.113400
P28	4796	5	44	0	0	0	0	0	0	VULV	B6	1.113500
P29	4864	45	61	62	71	0	0	0	0	OVL	C18	508.930000
P30	4915	41	61	62	71	0	0	0	0	OVL	C18	508.930000
P31	5020	10	61	0	0	0	0	0	0	VLLV	B6	0.856100
P32	5326	10	48	0	0	0	0	0	0	VLLV	B6	0.856100
P33	5336	5	50	0	0	0	0	0	0	VULV	B6	1.113400
P34	5478	42	61	62	71	0	0	0	0	OVL	C18	508.930000
P35	5628	10	59	0	0	0	0	0	0	VLLV	B6	0.856100
P36	5629	10	52	0	0	0	0	0	0	VLLV	B6	0.856100
P37	5630	10	51	0	0	0	0	0	0	VLLV	B6	0.856100
P38	5984	11	62	0	0	0	0	0	0	NC	-	-
P39	5985	10	70	0	0	0	0	0	0	VLLV	B6	0.856100
P40	6037	50	51	52	61	0	0	0	0	OVL	C1 C3 C4 C9	288.410000 251.180000 183.040000 175.810000
P41	6079	47	48	49	61	0	0	0	0	VLLV	B7 B8	0.645600 0.708900
P42	6246	40	47	48	49	0	0	0	0	VLLV	B7 B8	0.651700 0.714300
P43	6314	39	47	48	49	0	0	0	0	VLLV	B7 B8	0.651700 0.714300
P44	6411	11	61	0	0	0	0	0	0	NC	-	-
P45	6412	11	44	0	0	0	0	0	0	NC	-	-
P46	6497	50	51	52	62	0	0	0	0	OVL	C1 C3 C4	286.985405 250.017944 182.369149
P47	6938	11	43	0	0	0	0	0	0	NC	-	-
P48	6955	7	17	0	0	0	0	0	0	OVL	C19	510.587491
P49	6956	5	69	0	0	0	0	0	0	VULV	B6	1.114387
P50	6957	5	59	0	0	0	0	0	0	VULV	B6	1.113920
P51	7148	44	49	61	62	71	0	0	0	OVL	C18	515.354045
P52	7404	39	61	62	70	71	0	0	0	OVL	C18	518.026301
P53	7615	11	39	0	0	0	0	0	0	NC	-	-
P54	7616	10	69	0	0	0	0	0	0	VLLV	B6	0.856108
P55	7617	10	47	0	0	0	0	0	0	VLLV	B6	0.856108
P56	7618	10	42	0	0	0	0	0	0	VLLV	B6	0.856108
P57	7636	5	48	0	0	0	0	0	0	VULV	B6	1.111105
P58	7736	50	51	52	71	0	0	0	0	OVL	C1 C3	273.312708 242.591881
P59	8260	39	48	61	62	71	0	0	0	OVL	C18	515.353677
P60	8404	17	61	62	71	0	0	0	0	OVL	C18	565.539201
P61	8469	11	71	0	0	0	0	0	0	NC	-	-
P62	8487	5	60	0	0	0	0	0	0	VULV	B6	1.113938
P63	8488	5	51	0	0	0	0	0	0	VULV	B6	1.113401
P64	8489	5	45	0	0	0	0	0	0	VULV	B6	1.113389
P65	8615	50	51	52	60	0	0	0	0	OVL	C1	175.666240
P66	8710	47	48	49	62	0	0	0	0	VLLV	B7 B8	0.645410 0.708700
P67	8938	43	46	61	62	71	0	0	0	OVL	C18	513.293433
P68	9545	16	17	0	0	0	0	0	0	OVL	C3	181.484869
P69	9585	11	40	0	0	0	0	0	0	NC	-	-
P70	9586	10	56	0	0	0	0	0	0	VLLV	B6	0.856108
P71	9587	10	55	0	0	0	0	0	0	VLLV	B6	0.856108
P72	9588	10	46	0	0	0	0	0	0	VLLV	B6	0.856108
P73	9621	5	61	62	0	0	0	0	0	VULV	B6	1.108819
P74	9622	5	54	0	0	0	0	0	0	VULV	B6	1.113464
P75	9623	5	49	0	0	0	0	0	0	VULV	B6	1.111105
P76	9624	5	47	0	0	0	0	0	0	VULV	B6	1.111105
P77	9657	60	61	62	69	71	0	0	0	OVL	C18	577.811888
P78	9850	48	59	61	62	71	0	0	0	OVL	C18	575.244585
P79	10221	43	48	61	62	71	0	0	0	OVL	C18	515.354045
P80	10236	43	47	61	62	71	0	0	0	OVL	C18	515.354045
P81	10712	39	59	61	62	71	0	0	0	OVL	C18	544.614506
P82	11013	27	49	0	0	0	0	0	0	VLLV	B24	0.899952
P83	11177	11	60	0	0	0	0	0	0	NC	-	-
P84	11178	11	52	0	0	0	0	0	0	NC	-	-
P85	11179	11	51	0	0	0	0	0	0	NC	-	-
P86	11180	11	49	0	0	0	0	0	0	NC	-	-
P87	11181	10	60	0	0	0	0	0	0	VLLV	B6	0.856108
P88	11182	10	58	0	0	0	0	0	0	VLLV	B6	0.856108
P89	11183	10	57	0	0	0	0	0	0	VLLV	B6	0.856108
P90	11184	10	49	0	0	0	0	0	0	VLLV	B6	0.856108
P91	11185	10	43	71	0	0	0	0	0	VLLV	B6	0.856108
P92	11186	10	43	44	0	0	0	0	0	VLLV	B6	0.856108

VLLV – Voltage Lower Limit Violation in p.u.
VULV – Voltage Upper Limit Violation in p.u.
NC – No convergence
OVL – Overloading in MW
B* - Bus
C* - Component

P93	11187	10	40	69	0	0	0	0	0	VLLV	B6	0.856108
P94	11226	5	70	0	0	0	0	0	0	VULV	B6	1.114387
P95	11227	5	58	0	0	0	0	0	0	VULV	B6	1.113464
P96	11228	5	44	51	0	0	0	0	0	VULV	B6	1.113480
P97	11229	5	42	0	0	0	0	0	0	VULV	B6	1.113430
P98	11230	5	39	61	0	0	0	0	0	VULV	B6	1.113416
P99	11351	52	61	62	69	71	0	0	0	OVL	C18	513.756609
P100	11355	52	60	61	62	71	0	0	0	OVL	C18	540.021744
P101	11456	50	51	52	61	62	0	0	0	OVL	C1	525.544433
											C2	320.230558
											C3	426.853013
											C4	321.443066
											C5	280.270483
											C8	206.198857
											C9	308.410693
										VLLV	B3	0.875897
											B4	0.891648
P102	11466	49	61	62	69	71	0	0	0	OVL	C18	548.651255
P103	11472	49	59	61	62	69	0	0	0	OVL	C18	528.559700
P104	11494	49	51	61	62	71	0	0	0	OVL	C18	511.083645
P105	11663	47	48	49	71	0	0	0	0	VLLV	B7	0.656705
											B8	0.718619
P106	11664	47	48	49	58	0	0	0	0	VLLV	B7	0.653723
											B8	0.715995
P107	11665	47	48	49	51	0	0	0	0	VLLV	B7	0.653580
											B8	0.715869
P108	11666	47	48	49	50	0	0	0	0	VLLV	B7	0.653580
											B8	0.715869
P109	11698	46	52	61	62	71	0	0	0	OVL	C18	508.930703
P110	11765	45	51	61	62	71	0	0	0	OVL	C18	508.930703
P111	11903	44	50	51	52	61	0	0	0	OVL	C1	298.048830
											C3	251.526316
											C4	182.768095
											C9	176.127862
P112	11949	44	47	61	62	71	0	0	0	OVL	C18	515.354045
P113	11973	44	47	48	49	0	0	0	0	VLLV	B7	0.651712
											B8	0.714227
P114	12024	43	61	62	64	71	0	0	0	OVL	C18	500.415047
P115	12196	43	47	48	49	0	0	0	0	VLLV	B7	0.651712
											B8	0.714227
P116	12563	40	61	62	69	71	0	0	0	OVL	C18	518.026301
P117	12650	40	49	61	62	71	0	0	0	OVL	C18	515.353677
P118	12679	40	48	61	62	71	0	0	0	OVL	C18	515.353677
P119	12926	40	41	61	62	71	0	0	0	OVL	C18	513.288412
P120	12978	39	60	61	62	71	0	0	0	OVL	C18	544.301926
P121	13349	39	41	61	62	71	0	0	0	OVL	C18	513.288412
P122	13543	27	48	0	0	0	0	0	0	VLLV	B24	0.899952
P123	13544	27	47	0	0	0	0	0	0	VLLV	B24	0.899952
P124	13545	27	45	0	0	0	0	0	0	VLLV	B24	0.899287
P125	13605	17	60	61	62	0	0	0	0	OVL	C18	551.799663
P126	13820	11	61	62	0	0	0	0	0	NC	-	-
P127	13821	11	59	0	0	0	0	0	0	NC	-	-
P128	13822	11	43	51	0	0	0	0	0	NC	-	-
P129	13823	11	43	47	0	0	0	0	0	NC	-	-
P130	13824	10	67	0	0	0	0	0	0	VLLV	B6	0.856108
P131	13825	10	66	0	0	0	0	0	0	VLLV	B6	0.856108
P132	13826	10	54	0	0	0	0	0	0	VLLV	B6	0.856108
P133	13827	10	43	61	0	0	0	0	0	VLLV	B6	0.856108
P134	13828	10	41	0	0	0	0	0	0	VLLV	B6	0.856108
P135	13829	10	40	71	0	0	0	0	0	VLLV	B6	0.856108
P136	13830	10	40	62	0	0	0	0	0	VLLV	B6	0.856108
P137	13831	10	39	62	0	0	0	0	0	VLLV	B6	0.856108
P138	13832	10	39	61	0	0	0	0	0	VLLV	B6	0.856108
P139	13833	10	39	44	0	0	0	0	0	VLLV	B6	0.856108
P140	13834	10	39	40	0	0	0	0	0	VLLV	B6	0.856108
P141	13905	5	70	71	0	0	0	0	0	VULV	B6	1.115001
P142	13906	5	63	0	0	0	0	0	0	VULV	B6	1.113631
P143	13907	5	52	61	0	0	0	0	0	VULV	B6	1.113461
P144	13908	5	44	61	0	0	0	0	0	VULV	B6	1.113409
P145	13909	5	40	71	0	0	0	0	0	VULV	B6	1.115042
P146	13910	5	40	43	0	0	0	0	0	VULV	B6	1.113544
P147	13911	5	39	44	0	0	0	0	0	VULV	B6	1.113544
P148	13958	61	62	69	70	71	0	0	0	OVL	C18	562.101907
P149	13998	59	61	62	69	71	0	0	0	OVL	C18	578.237665
P150	14251	51	61	62	69	71	0	0	0	OVL	C18	513.756609
P151	14259	51	60	61	62	71	0	0	0	OVL	C18	540.021744
P152	14269	51	59	61	62	71	0	0	0	OVL	C18	540.334761
P153	14335	50	61	62	69	71	0	0	0	OVL	C18	513.756609
P154	14433	50	51	52	70	0	0	0	0	OVL	C1	177.740332
P155	14456	49	60	61	62	71	0	0	0	OVL	C18	574.955017
P156	14560	49	50	51	52	62	0	0	0	OVL	C1	333.898364
											C2	180.809649
											C3	284.446245
											C4	207.355226
											C5	192.469423
											C9	204.179209
P157	14569	48	61	62	69	71	0	0	0	OVL	C18	548.651255
P158	14760	47	54	61	62	71	0	0	0	OVL	C18	516.009166
P159	14767	47	52	61	62	71	0	0	0	OVL	C18	511.083645
P160	14803	47	50	61	62	71	0	0	0	OVL	C18	511.083645
P161	14870	47	48	49	70	0	0	0	0	VLLV	B7	0.656217
											B8	0.718189
P162	14871	47	48	49	60	0	0	0	0	VLLV	B7	0.653631
											B8	0.715913
P163	14872	47	48	49	55	0	0	0	0	VLLV	B7	0.653723
											B8	0.715995
P164	14873	47	48	49	52	0	0	0	0	VLLV	B7	0.653580
											B8	0.715869
P165	14900	46	59	61	62	69	0	0	0	OVL	C18	526.458228
P166	14978	46	50	51	52	0	0	0	0	OVL	C1	179.871762
P167	15049	45	61	62	69	71	0	0	0	OVL	C18	546.524292
P168	15112	45	50	51	52	0	0	0	0	OVL	C1	179.871762
P169	15182	44	61	62	70	71	0	0	0	OVL	C18	518.026194
P170	15183	44	61	62	69	71	0	0	0	OVL	C18	518.026194
P171	15189	44	60	61	62	71	0	0	0	OVL	C18	544.301288
P172	15208	44	59	60	61	62	0	0	0	OVL	C18	526.173163
P173	15413	44	48	61	62	71	0	0	0	OVL	C18	515.354045
P174	15419	44	48	59	61	62	71	0	0	OVL	C18	579.529388
P175	15620	43	61	62	70	71	0	0	0	OVL	C18	518.026194

P176	15621	43	61	62	69	71	0	0	0	OVL	C18	518.026194
P177	15631	43	60	61	62	71	0	0	0	OVL	C18	544.301288
P178	15641	43	59	61	62	71	0	0	0	OVL	C18	544.613667
P179	15735	43	51	59	61	62	71	0	0	OVL	C18	544.613667
P180	15802	43	50	51	52	62	0	0	0	OVL	C1	296.624433
											C3	250.365466
											C4	182.102002
											C9	175.113663
P181	15803	43	50	51	52	61	0	0	0	OVL	C1	298.048830
											C3	251.526316
											C4	182.768095
											C9	176.127862
P182	15810	43	49	61	62	71	0	0	0	OVL	C18	515.354045
P183	16165	42	59	61	62	71	0	0	0	OVL	C18	573.179041
P184	16166	42	59	61	62	70	0	0	0	OVL	C18	526.459271
P185	16230	42	49	59	61	62	0	0	0	OVL	C18	525.025642
P186	16303	42	44	61	62	71	0	0	0	OVL	C18	513.281000
P187	16346	42	43	61	62	71	0	0	0	OVL	C18	513.281000
P188	16406	41	60	61	62	69	0	0	0	OVL	C18	526.317579
P189	16671	40	61	62	70	71	0	0	0	OVL	C18	518.026301
P190	16672	40	61	62	66	71	0	0	0	OVL	C18	500.415124
P191	16682	40	60	61	62	71	0	0	0	OVL	C18	544.301926
P192	16692	40	59	61	62	71	0	0	0	OVL	C18	544.614506
P193	16840	40	50	51	52	71	0	0	0	OVL	C1	273.312708
											C3	242.591881
P194	16841	40	50	51	52	62	0	0	0	OVL	C1	286.985405
											C3	250.017944
											C4	182.369149
P195	16842	40	50	51	52	61	0	0	0	OVL	C1	288.408861
											C3	251.178886
											C4	183.035227
P196	16855	40	49	60	61	62	71	0	0	OVL	C18	579.241059
P197	16935	40	47	61	62	71	0	0	0	OVL	C18	515.353677
P198	17083	40	44	61	62	69	71	0	0	OVL	C18	522.307368
P199	17088	40	44	60	61	62	71	0	0	OVL	C18	548.593017
P200	17448	39	61	62	67	71	0	0	0	OVL	C18	500.415124
P201	17449	39	61	62	66	71	0	0	0	OVL	C18	500.415124
P202	17473	39	59	60	61	62	0	0	0	OVL	C18	526.174277
P203	17477	39	58	60	61	62	69	0	0	OVL	C18	502.745797
P204	17553	39	51	59	61	62	71	0	0	OVL	C18	544.614506
P205	17582	39	50	60	61	62	71	0	0	OVL	C18	544.301926
P206	17609	39	49	61	62	71	0	0	0	OVL	C18	515.353677
P207	17696	39	47	61	62	71	0	0	0	OVL	C18	515.353677
P208	17836	39	44	61	62	64	71	0	0	OVL	C18	504.695241
P209	17923	39	44	47	48	49	0	0	0	VLLV	B7	0.649695
											B8	0.712456
P210	18467	36	61	62	0	0	0	0	0	OVL	C37	530.199171
P211	18600	27	40	47	0	0	0	0	0	VLLV	B24	0.899556
P212	18703	20	61	62	0	0	0	0	0	OVL	C18	559.831455
P213	18805	17	44	61	62	71	0	0	0	OVL	C18	570.868637
P214	19003	16	17	61	0	0	0	0	0	OVL	C3	178.875645
P215	19011	15	61	62	71	0	0	0	0	OVL	C18	543.895836
P216	19298	11	69	0	0	0	0	0	0	NC	-	-
P217	19299	11	54	0	0	0	0	0	0	NC	-	-
P218	19300	11	50	0	0	0	0	0	0	NC	-	-
P219	19301	11	49	54	0	0	0	0	0	NC	-	-
P220	19302	11	47	0	0	0	0	0	0	NC	-	-
P221	19303	11	40	62	0	0	0	0	0	NC	-	-
P222	19304	11	16	43	0	0	0	0	0	NC	-	-
P223	19305	10	68	0	0	0	0	0	0	VLLV	B6	0.856108
P224	19306	10	65	0	0	0	0	0	0	VLLV	B6	0.856108
P225	19307	10	62	71	0	0	0	0	0	VLLV	B6	0.856108
P226	19308	10	52	69	0	0	0	0	0	VLLV	B6	0.856108
P227	19309	10	51	62	0	0	0	0	0	VLLV	B6	0.856108
P228	19310	10	51	61	0	0	0	0	0	VLLV	B6	0.856108
P229	19311	10	45	0	0	0	0	0	0	VLLV	B6	0.856108
P230	19312	10	44	71	0	0	0	0	0	VLLV	B6	0.856108
P231	19313	10	44	62	0	0	0	0	0	VLLV	B6	0.856108
P232	19314	10	44	48	0	0	0	0	0	VLLV	B6	0.856108
P233	19315	10	43	62	0	0	0	0	0	VLLV	B6	0.856108
P234	19316	10	43	56	0	0	0	0	0	VLLV	B6	0.856108
P235	19317	10	43	52	0	0	0	0	0	VLLV	B6	0.856108
P236	19318	10	43	47	0	0	0	0	0	VLLV	B6	0.856108
P237	19319	10	43	44	71	0	0	0	0	VLLV	B6	0.856108
P238	19320	10	40	61	0	0	0	0	0	VLLV	B6	0.856108
P239	19321	10	40	43	0	0	0	0	0	VLLV	B6	0.856108
P240	19322	10	39	52	61	0	0	0	0	VLLV	B6	0.856108
P241	19323	10	39	47	62	0	0	0	0	VLLV	B6	0.856108
P242	19324	10	39	43	71	0	0	0	0	VLLV	B6	0.856108
P243	19475	7	21	69	0	0	0	0	0	OVL	C23	534.801001
P244	19478	7	15	0	0	0	0	0	0	OVL	C23	505.002518
P245	19479	7	15	43	0	0	0	0	0	OVL	C23	506.024501
P246	19481	7	10	0	0	0	0	0	0	VLLV	B6	0.856108
P247	19500	5	68	0	0	0	0	0	0	VULV	B6	1.113631
P248	19501	5	62	71	0	0	0	0	0	VULV	B6	1.112556
P249	19502	5	52	62	0	0	0	0	0	VULV	B6	1.113444
P250	19503	5	51	62	0	0	0	0	0	VULV	B6	1.113444
P251	19504	5	50	70	0	0	0	0	0	VULV	B6	1.114387
P252	19505	5	44	71	0	0	0	0	0	VULV	B6	1.115033
P253	19506	5	44	58	0	0	0	0	0	VULV	B6	1.113539
P254	19507	5	44	50	0	0	0	0	0	VULV	B6	1.113480
P255	19508	5	44	47	0	0	0	0	0	VULV	B6	1.111119
P256	19509	5	43	59	0	0	0	0	0	VULV	B6	1.113945
P257	19510	5	43	49	0	0	0	0	0	VULV	B6	1.111119
P258	19511	5	40	62	0	0	0	0	0	VULV	B6	1.113395
P259	19512	5	40	48	0	0	0	0	0	VULV	B6	1.111128
P260	19513	5	40	47	0	0	0	0	0	VULV	B6	1.111128
P261	19514	5	39	62	0	0	0	0	0	VULV	B6	1.113395
P262	19515	5	39	51	0	0	0	0	0	VULV	B6	1.113489
P263	19516	5	39	50	0	0	0	0	0	VULV	B6	1.113489
P264	19517	5	39	49	0	0	0	0	0	VULV	B6	1.111128
P265	19625	61	62	68	69	71	0	0	0	OVL	C18	533.814744
P266	19627	61	62	67	69	71	0	0	0	OVL	C18	533.814744
P267	19629	61	62	65	68	71	0	0	0	OVL	C18	516.323810
P268	19668	60	61	62	69	70	0	0	0	OVL	C18	530.390067
P269	19669	60	61	62	68	71	0	0	0	OVL	C18	560.285846
P270	19670	60	61	62	68	69	0	0	0	OVL	C18	513.649791
P271	19671	60	61	62	65	69	0	0	0	OVL	C18	513.649791
P272	19673	60	61	62	63	70	0	0	0	OVL	C18	513.649791

P273	19711	59	61	62	70	71	0	0	0	OVL	C18	578.237665
P274	19712	59	61	62	67	71	0	0	0	OVL	C18	560.604883
P275	19713	59	61	62	66	70	0	0	0	OVL	C18	513.797856
P276	19734	59	60	61	62	71	0	0	0	OVL	C18	605.196077
P277	19735	59	60	61	62	69	0	0	0	OVL	C18	558.354482
P278	19770	58	60	61	62	71	0	0	0	OVL	C18	545.023931
P279	19778	58	59	61	62	71	0	0	0	OVL	C18	545.348674
P280	19779	58	59	61	62	67	71	0	0	OVL	C18	565.643706
P281	19813	57	61	62	70	71	0	0	0	OVL	C18	518.707033
P282	19814	57	61	62	69	71	0	0	0	OVL	C18	518.707033
P283	19847	57	59	61	62	71	0	0	0	OVL	C18	545.348674
P284	19891	56	61	62	70	71	0	0	0	OVL	C18	518.707033
P285	19910	56	60	61	62	71	0	0	0	OVL	C18	545.023931
P286	19927	56	59	60	61	62	0	0	0	OVL	C18	526.941303
P287	19987	55	61	62	66	71	0	0	0	OVL	C18	501.095228
P288	20011	55	59	61	62	71	0	0	0	OVL	C18	545.348674
P289	20015	55	59	60	61	62	0	0	0	OVL	C18	526.941303
P290	20118	54	59	61	62	71	0	0	0	OVL	C18	545.348674
P291	20120	54	59	61	62	65	67	0	0	OVL	C18	502.626279
P292	20220	52	61	62	70	71	0	0	0	OVL	C18	513.756609
P293	20251	52	59	61	62	71	0	0	0	OVL	C18	540.334761
P294	20258	52	59	60	61	62	0	0	0	OVL	C18	521.880770
P295	20415	51	61	62	70	71	0	0	0	OVL	C18	513.756609
P296	20450	51	59	61	62	70	71	0	0	OVL	C18	578.237665
P297	20612	51	52	60	61	62	71	0	0	OVL	C18	540.021744
P298	20685	50	61	62	70	71	0	0	0	OVL	C18	513.756609
P299	20707	50	60	61	62	71	0	0	0	OVL	C18	540.021744
P300	20726	50	59	61	62	71	0	0	0	OVL	C18	540.334761
P301	20731	50	59	60	61	62	0	0	0	OVL	C18	521.880770
P302	21004	50	51	52	69	0	0	0	0	OVL	C1	177.740332
P303	21010	50	51	52	62	71	0	0	0	OVL	C1	491.584294
											C2	281.159149
											C3	401.837711
											C4	298.235344
											C5	264.641823
											C8	191.445671
											C9	292.924241
P304	21011	50	51	52	62	70	0	0	0	OVL	C1	370.484939
											C2	207.412451
											C3	310.396542
											C4	227.956670
											C5	208.185977
											C9	225.537633
P305	21012	50	51	52	62	66	0	0	0	OVL	C1	311.651111
											C2	175.110068
											C3	267.455516
											C4	195.899580
											C5	182.133551
											C9	189.805783
P306	21013	50	51	52	60	69	0	0	0	OVL	C1	250.220613
											C3	225.401733
P307	21014	50	51	52	60	61	0	0	0	OVL	C1	371.407383
											C2	212.165494
											C3	310.530996
											C4	228.928226
											C5	208.202657
											C9	225.480595
P308	21016	50	51	52	59	69	0	0	0	OVL	C1	248.567800
											C3	223.835611
P309	21017	50	51	52	59	62	0	0	0	OVL	C1	368.731411
											C2	214.616282
											C3	308.031617
											C4	227.833027
											C5	206.638415
											C9	223.448643
P310	21018	50	51	52	58	62	0	0	0	OVL	C1	293.017544
											C3	254.261510
											C4	185.678885
											C9	178.474026
P311	21020	50	51	52	55	61	0	0	0	OVL	C1	294.438428
											C3	255.421785
											C4	186.344584
											C9	179.483371
P312	21060	49	61	62	70	71	0	0	0	OVL	C18	548.651255
P313	21066	49	61	62	63	69	71	0	0	OVL	C18	568.719269
P314	21083	49	60	61	62	70	0	0	0	OVL	C18	528.437132
P315	21097	49	59	61	62	66	71	0	0	OVL	C18	595.522478
P316	21203	49	54	61	62	71	0	0	0	OVL	C18	516.009166
P317	21238	49	52	61	62	71	0	0	0	OVL	C18	511.083645
P318	21245	49	52	60	61	62	71	0	0	OVL	C18	574.955017
P319	21297	49	51	61	62	66	71	0	0	OVL	C18	531.037794
P320	21369	49	50	61	62	69	71	0	0	OVL	C18	548.651255
P321	21381	49	50	59	61	62	66	70	0	OVL	C18	548.722355
P322	21434	49	50	51	52	57	61	0	0	OVL	C1	341.691250
											C2	184.929277
											C3	290.149003
											C4	211.578498
											C5	195.929520
											C9	208.938654
P323	21471	48	61	62	70	71	0	0	0	OVL	C18	548.651255
P324	21472	48	61	62	69	70	0	0	0	OVL	C18	501.501414
P325	21473	48	61	62	68	71	0	0	0	OVL	C18	531.037794
P326	21474	48	61	62	68	69	71	0	0	OVL	C18	568.719269
P327	21476	48	61	62	66	69	70	0	0	OVL	C18	521.429033
P328	21487	48	60	61	62	71	0	0	0	OVL	C18	574.955017
P329	21488	48	60	61	62	69	0	0	0	OVL	C18	528.437132
P330	21489	48	60	61	62	67	0	0	0	OVL	C18	512.283598
P331	21499	48	59	61	62	68	0	0	0	OVL	C18	512.240857
P332	21531	48	57	61	62	71	0	0	0	OVL	C18	516.009166
P333	21649	48	52	61	62	71	0	0	0	OVL	C18	511.083645
P334	21702	48	51	61	62	66	71	0	0	OVL	C18	531.037794
P335	21770	48	50	61	62	71	0	0	0	OVL	C18	511.083645
P336	21840	48	50	51	52	62	69	0	0	OVL	C1	421.939575
											C2	232.847477
											C3	349.089417
											C4	256.460427
											C5	231.937015
											C9	255.822509
P337	21841	48	50	51	52	59	0	0	0	OVL	C1	216.732336

											C3	201.612305
P338	21861	48	49	61	62	71	0	0	0	OVL	C18	548.353068
P339	21862	48	49	61	62	69	0	0	0	OVL	C18	502.078468
P340	21875	48	49	59	61	62	0	0	0	OVL	C18	529.527196
P341	21971	47	61	62	70	71	0	0	0	OVL	C18	548.651255
P342	21972	47	61	62	69	71	0	0	0	OVL	C18	548.651255
P343	21973	47	61	62	64	69	71	0	0	OVL	C18	568.719269
P344	22010	47	59	60	61	62	0	0	0	OVL	C18	556.886799
P345	22060	47	56	61	62	69	71	0	0	OVL	C18	553.604224
P346	22125	47	54	55	60	61	62	0	0	OVL	C18	502.117873
P347	22202	47	51	61	62	66	71	0	0	OVL	C18	531.037794
P348	22213	47	51	59	61	62	64	0	0	OVL	C18	512.240857
P349	22340	47	50	51	52	61	0	0	0	OVL	C1 C2 C3 C4 C5 C9	335.379832 180.609406 285.659429 208.064305 193.215742 205.200565
P350	22341	47	50	51	52	57	62	0	0	OVL	C1 C2 C3 C4 C5 C9	340.211527 185.129596 288.935041 210.868619 195.182031 207.922811
P351	22349	47	49	61	62	69	0	0	0	OVL	C18	502.078468
P352	22359	47	49	59	61	65	69	71	0	OVL	C18	507.244196
P353	22423	47	49	50	61	62	71	0	0	OVL	C18	548.353068
P354	22424	47	49	50	61	62	66	71	0	OVL	C18	568.312073
P355	22454	47	48	61	62	71	0	0	0	OVL	C18	548.353068
P356	22455	47	48	61	62	65	71	0	0	OVL	C18	568.312073
P357	22459	47	48	60	61	62	0	0	0	OVL	C18	529.592100
P358	22520	47	48	49	66	0	0	0	0	VLLV	B7 B8	0.653988 0.716228
P359	22521	47	48	49	59	0	0	0	0	VLLV	B7 B8	0.653554 0.715846
P360	22522	47	48	49	59	62	0	0	0	VLLV	B7 B8	0.631702 0.696746
P361	22523	47	48	49	59	61	0	0	0	VLLV	B7 B8	0.632176 0.697158
P362	22524	47	48	49	56	0	0	0	0	VLLV	B7 B8	0.653723 0.715995
P363	22525	47	48	49	56	69	0	0	0	VLLV	B7 B8	0.656192 0.718167
P364	22526	47	48	49	55	71	0	0	0	VLLV	B7 B8	0.656468 0.718411
P365	22527	47	48	49	52	61	0	0	0	VLLV	B7 B8	0.645621 0.708884
P366	22528	47	48	49	52	58	0	0	0	VLLV	B7 B8	0.653723 0.715995
P367	22529	47	48	49	50	56	0	0	0	VLLV	B7 B8	0.653723 0.715995
P368	22563	46	61	62	70	71	0	0	0	OVL	C18	546.524292
P369	22578	46	60	61	62	66	0	0	0	OVL	C18	510.162944
P370	22593	46	59	61	62	71	0	0	0	OVL	C18	573.174971
P371	22594	46	59	61	62	70	71	0	0	OVL	C18	611.120464
P372	22745	46	51	61	62	71	0	0	0	OVL	C18	508.930703
P373	22779	46	51	52	61	62	71	0	0	OVL	C18	508.930703
P374	22840	46	50	51	52	56	0	0	0	OVL	C1	184.903732
P375	22858	46	49	59	61	62	0	0	0	OVL	C18	525.028341
P376	22904	46	48	61	62	64	70	0	0	OVL	C18	517.394004
P377	22932	46	48	52	61	62	71	0	0	OVL	C18	543.864722
P378	22936	46	48	51	61	62	71	0	0	OVL	C18	543.864722
P379	22946	46	48	50	51	52	0	0	0	OVL	C1	220.720624
P380	22969	46	47	61	62	71	0	0	0	OVL	C18	543.864722
P381	22975	46	47	60	61	62	0	0	0	OVL	C18	525.075275
P382	22978	46	47	59	61	62	71	0	0	OVL	C18	608.142888
P383	23033	46	47	48	61	62	71	0	0	OVL	C18	581.229249
P384	23043	46	47	48	49	51	54	70	0	VLLV	B7 B8	0.635657 0.700185
P385	23074	45	61	62	70	71	0	0	0	OVL	C18	546.524292
P386	23084	45	60	61	62	71	0	0	0	OVL	C18	572.867037
P387	23085	45	60	61	62	70	0	0	0	OVL	C18	526.317932
P388	23086	45	60	61	62	69	0	0	0	OVL	C18	526.317932
P389	23097	45	59	61	62	71	0	0	0	OVL	C18	573.174971
P390	23098	45	59	61	62	68	0	0	0	OVL	C18	510.136770
P391	23113	45	58	61	62	71	0	0	0	OVL	C18	513.862745
P392	23214	45	52	60	61	62	70	0	0	OVL	C18	526.317932
P393	23325	45	50	51	52	71	0	0	0	OVL	C1 C3	346.610993 245.240933
P394	23336	45	49	61	62	71	0	0	0	OVL	C18	543.864722
P395	23350	45	49	59	61	62	0	0	0	OVL	C18	525.028341
P396	23411	45	48	61	62	71	0	0	0	OVL	C18	543.864722
P397	23416	45	48	59	61	62	0	0	0	OVL	C18	525.028341
P398	23500	45	47	60	61	62	0	0	0	OVL	C18	525.075275
P399	23559	45	47	48	49	0	0	0	0	VLLV	B7 B8	0.633326 0.698157
P400	23566	45	46	61	62	71	0	0	0	OVL	C18	542.428432
P401	23653	44	61	62	67	71	0	0	0	OVL	C18	500.415047
P402	23655	44	61	62	65	71	0	0	0	OVL	C18	500.415047
P403	23698	44	59	61	62	71	0	0	0	OVL	C18	544.613667
P404	23700	44	59	61	62	65	69	0	0	OVL	C18	518.077239
P405	23760	44	57	61	62	69	71	0	0	OVL	C18	522.977790
P406	23936	44	52	59	61	62	71	0	0	OVL	C18	544.613667
P407	24009	44	51	61	62	70	71	0	0	OVL	C18	518.026194
P408	24025	44	51	60	61	62	71	0	0	OVL	C18	544.301288
P409	24186	44	50	52	61	62	69	71	0	OVL	C18	518.026194
P410	24218	44	50	51	52	71	0	0	0	OVL	C1 C3	282.941455 242.939649
P411	24384	44	48	60	61	62	71	0	0	OVL	C18	579.240569
P412	24520	44	48	49	50	51	52	0	0	OVL	C1 C3	202.657896 186.449467
P413	24604	44	47	52	61	62	71	0	0	OVL	C18	515.354045
P414	24676	44	47	49	60	61	62	0	0	OVL	C18	533.886938
P415	24713	44	47	48	49	61	62	0	0	VLLV NC	B7 B8 -	0.542248 0.620420 -
										OVL	C18	529.430014
P416	24714	44	47	48	49	51	61	62	0	VLLV	B7 B8	0.542248 0.620420

										NC	-	-
										OVL	C18	529.430014
P417	24715	44	47	48	49	51	60	62	0	VLLV	B7	0.629393
											B8	0.694742
P418	24716	44	47	48	49	50	59	0	0	VLLV	B7	0.651448
											B8	0.713995
P419	24731	44	46	61	62	71	0	0	0	OVL	C18	513.293433
P420	24788	44	46	51	61	62	71	0	0	OVL	C18	513.293433
P421	24874	44	45	61	62	71	0	0	0	OVL	C18	513.293433
P422	24979	44	45	47	61	62	69	0	0	OVL	C18	501.899316
P423	25046	43	61	62	67	71	0	0	0	OVL	C18	500.415047
P424	25049	43	61	62	65	71	0	0	0	OVL	C18	500.415047
P425	25076	43	60	61	62	69	70	0	0	OVL	C18	534.668715
P426	25103	43	59	61	62	64	71	0	0	OVL	C18	564.887794
P427	25135	43	58	59	61	62	71	0	0	OVL	C18	549.628686
P428	25281	43	54	61	62	70	71	0	0	OVL	C18	522.977790
P429	25425	43	51	61	62	68	71	0	0	OVL	C18	500.415047
P430	25657	43	50	51	52	69	0	0	0	OVL	C1	187.286104
P431	25658	43	50	51	52	69	71	0	0	OVL	C1	366.290493
											C2	181.261152
											C3	303.017984
											C4	218.273651
											C5	203.416804
											C9	219.755519
P432	25659	43	50	51	52	61	69	0	0	OVL	C1	381.732340
											C2	207.487158
											C3	312.017168
											C4	228.454867
											C5	208.701422
											C9	226.867371
P433	25660	43	50	51	52	60	70	0	0	OVL	C1	259.832957
											C3	225.750338
P434	25661	43	50	51	52	59	0	0	0	OVL	C1	183.689800
P435	25662	43	50	51	52	56	60	0	0	OVL	C1	190.541870
											C3	176.063418
P436	25697	43	49	59	61	62	71	0	0	OVL	C18	579.529388
P437	25755	43	49	52	61	62	71	0	0	OVL	C18	515.354045
P438	25810	43	49	50	51	52	59	0	0	OVL	C1	226.318853
											C3	201.961335
P439	25953	43	48	49	59	61	62	0	0	OVL	C18	533.819757
P440	25992	43	47	60	61	62	70	0	0	OVL	C18	532.720348
P441	25997	43	47	59	61	62	68	0	0	OVL	C18	516.526736
P442	26015	43	47	57	61	62	71	0	0	OVL	C18	520.280690
P443	26023	43	47	56	61	62	71	0	0	OVL	C18	520.280690
P444	26142	43	47	48	61	62	69	0	0	OVL	C18	506.356040
P445	26163	43	47	48	49	68	0	0	0	VLLV	B7	0.652066
											B8	0.714538
P446	26164	43	47	48	49	61	0	0	0	VLLV	B7	0.642824
											B8	0.706438
P447	26165	43	47	48	49	61	71	0	0	VLLV	B7	0.629163
											B8	0.694543
P448	26166	43	47	48	49	57	0	0	0	VLLV	B7	0.651842
											B8	0.714341
P449	26241	43	46	51	61	62	69	71	0	OVL	C18	550.891500
P450	26271	43	46	49	60	61	62	0	0	OVL	C18	529.461631
P451	26326	43	45	61	62	71	0	0	0	OVL	C18	513.293433
P452	26456	43	45	46	61	62	71	0	0	OVL	C18	546.895996
P453	26458	43	45	46	59	61	62	69	0	OVL	C18	564.530725
P454	26740	43	44	48	61	62	71	0	0	OVL	C18	519.637272
P455	26747	43	44	48	59	60	61	62	0	OVL	C18	565.498447
P456	26767	43	44	48	50	51	52	62	0	OVL	C1	353.244039
											C2	181.247697
											C3	285.137168
											C4	206.824213
											C5	191.918202
											C9	204.799265
P457	26836	43	44	46	61	62	71	0	0	OVL	C18	517.669524
P458	26936	42	61	62	70	71	0	0	0	OVL	C18	546.522797
P459	26937	42	61	62	66	67	70	71	0	OVL	C18	586.939745
P460	26939	42	61	62	64	69	70	0	0	OVL	C18	519.290269
P461	26959	42	60	61	62	71	0	0	0	OVL	C18	572.869585
P462	26960	42	60	61	62	70	0	0	0	OVL	C18	526.317579
P463	26970	42	59	61	62	69	0	0	0	OVL	C18	526.459271
P464	26985	42	58	61	62	71	0	0	0	OVL	C18	513.859319
P465	27053	42	54	57	59	61	62	70	0	OVL	C18	536.457212
P466	27203	42	50	51	52	61	0	0	0	OVL	C1	288.408861
											C3	251.178886
											C4	183.035227
											C9	175.808141
P467	27216	42	49	60	61	62	0	0	0	OVL	C18	525.071326
P468	27218	42	49	59	61	62	69	0	0	OVL	C18	561.429848
P469	27284	42	48	56	61	62	71	0	0	OVL	C18	548.793992
P470	27338	42	47	61	62	71	0	0	0	OVL	C18	543.859393
P471	27342	42	47	60	61	62	0	0	0	OVL	C18	525.071326
P472	27394	42	47	48	49	71	0	0	0	OVL	B7	0.635515
											B8	0.700062
P473	27405	42	46	60	61	62	0	0	0	OVL	C18	523.587571
P474	27661	42	44	46	61	62	70	0	0	OVL	C18	500.450428
P475	27760	42	43	50	61	62	71	0	0	OVL	C18	513.281000
P476	27816	42	43	47	61	62	71	0	0	OVL	C18	548.221286
P477	27840	42	43	46	55	61	62	71	0	OVL	C18	551.760096
P478	27934	41	60	61	62	71	0	0	0	OVL	C18	572.869585
P479	28048	41	52	61	62	71	0	0	0	OVL	C18	508.926650
P480	28081	41	51	61	62	71	0	0	0	OVL	C18	508.926650
P481	28192	41	50	51	61	62	71	0	0	OVL	C18	508.926650
P482	28210	41	49	61	62	71	0	0	0	OVL	C18	543.859393
P483	28260	41	49	50	59	61	62	0	0	OVL	C18	525.025642
P484	28344	41	47	59	61	62	0	0	0	OVL	C18	525.025642
P485	28410	41	47	48	49	61	71	0	0	VLLV	B7	0.624391
											B8	0.689585
										NC	-	-
P486	28418	41	46	60	61	62	0	0	0	OVL	C18	523.587571
P487	28500	41	45	50	60	61	62	0	0	OVL	C18	523.587571
P488	28556	41	44	59	61	62	71	0	0	OVL	C18	577.547741
P489	28726	41	43	61	62	71	0	0	0	OVL	C18	513.281000
P490	28831	41	43	48	61	62	71	0	0	OVL	C18	548.221286
P491	28851	41	43	47	61	62	69	0	0	OVL	C18	501.882363
P492	28995	41	42	47	61	62	71	0	0	OVL	C18	577.418314
P493	29011	41	42	44	61	62	71	0	0	OVL	C18	546.864416

P494	29093	40	61	62	65	71	0	0	0	OVL	C18	500.415124
P495	29133	40	59	61	62	70	71	0	0	OVL	C18	582.523478
P496	29142	40	59	60	61	62	0	0	0	OVL	C18	526.174277
P497	29221	40	56	61	62	63	71	0	0	OVL	C18	505.365073
P498	29307	40	54	61	62	70	71	0	0	OVL	C18	522.977979
P499	29314	40	54	60	61	62	70	0	0	OVL	C18	502.745797
P500	29382	40	52	59	61	62	71	0	0	OVL	C18	544.614506
P501	29466	40	51	61	62	69	71	0	0	OVL	C18	518.026301
P502	29584	40	50	59	61	62	71	0	0	OVL	C18	544.614506
P503	29660	40	50	51	52	60	0	0	0	OVL	C1	175.666240
P504	29678	40	49	61	62	70	71	0	0	OVL	C18	552.926549
P505	29679	40	49	61	62	69	71	0	0	OVL	C18	552.926549
P506	29681	40	49	61	62	63	71	0	0	OVL	C18	535.312200
P507	29699	40	49	59	60	61	62	71	0	OVL	C18	644.475996
P508	29715	40	49	57	60	61	62	0	0	OVL	C18	501.431475
P509	29768	40	49	51	59	61	62	66	70	OVL	C18	553.008546
P510	29983	40	47	60	61	62	70	0	0	OVL	C18	532.720463
P511	29984	40	47	60	61	62	66	69	0	OVL	C18	552.891986
P512	29994	40	47	59	61	62	69	0	0	OVL	C18	532.841774
P513	30043	40	47	52	60	61	62	65	71	OVL	C18	599.519113
P514	30060	40	47	51	61	62	71	0	0	OVL	C18	515.353677
P515	30157	40	46	61	62	71	0	0	0	OVL	C18	513.284853
P516	30286	40	46	47	60	61	62	67	0	OVL	C18	549.590245
P517	30300	40	46	47	48	61	62	0	0	OVL	C18	503.218269
P518	30318	40	45	61	62	71	0	0	0	OVL	C18	513.284853
P519	30499	40	44	61	62	70	71	0	0	OVL	C18	522.307368
P520	30520	40	44	59	61	62	70	0	0	OVL	C18	502.203672
P521	30521	40	44	59	61	62	69	0	0	OVL	C18	502.203672
P522	30716	40	44	50	51	52	60	0	0	OVL	C1	185.209515
P523	30738	40	44	49	59	60	61	62	0	OVL	C18	565.498310
P524	30884	40	44	47	48	49	0	0	0	VLLV	B7 B8	0.649695 0.712456
P525	30894	40	44	46	61	62	71	0	0	OVL	C18	517.659812
P526	30993	40	43	61	62	69	71	0	0	OVL	C18	522.307368
P527	31123	40	43	51	61	62	67	71	0	OVL	C18	504.695241
P528	31164	40	43	50	60	61	62	69	0	OVL	C18	502.055537
P529	31269	40	43	48	51	59	61	62	0	OVL	C18	500.728002
P530	31298	40	43	47	61	62	71	0	0	OVL	C18	519.635822
P531	31307	40	43	47	59	61	62	0	0	OVL	C18	500.728002
P532	31348	40	43	47	48	49	0	0	0	VLLV	B7 B8	0.649695 0.712456
P533	31349	40	43	47	48	49	51	54	0	VLLV	B7 B8	0.649811 0.712558
P534	31479	40	43	44	51	59	61	62	#	OVL	C18	553.208083
P535	31570	40	42	61	62	71	0	0	0	OVL	C18	513.288412
P536	31705	40	42	47	48	49	0	0	0	VLLV	B7 B8	0.629686 0.694996
P537	31848	40	41	60	61	62	71	0	0	OVL	C18	577.247301
P538	31854	40	41	59	60	61	62	0	0	OVL	C18	559.229998
P539	31886	40	41	54	61	62	71	0	0	OVL	C18	518.222271
P540	31988	40	41	46	61	62	71	0	0	OVL	C18	546.816939
P541	32064	40	41	43	61	62	71	0	0	OVL	C18	517.654984
P542	32166	39	61	62	69	71	0	0	0	OVL	C18	518.026301
P543	32375	39	54	59	61	62	65	71	0	OVL	C18	569.928933
P544	32520	39	51	59	60	61	62	0	0	OVL	C18	526.174277
P545	32608	39	50	61	62	69	71	0	0	OVL	C18	518.026301
P546	32717	39	50	51	52	60	62	0	0	OVL	C18	18.150170
P547	32740	39	49	60	61	62	71	0	0	OVL	C18	579.241059
P548	32741	39	49	60	61	62	70	0	0	OVL	C18	532.720463
P549	32762	39	49	57	61	62	71	0	0	OVL	C18	520.280404
P550	32830	39	49	50	61	62	69	71	0	OVL	C18	552.926549
P551	32875	39	48	61	62	67	71	0	0	OVL	C18	535.312200
P552	33187	39	47	49	50	61	62	69	0	OVL	C18	506.355038
P553	33218	39	47	48	49	70	0	0	0	VLLV	B7 B8	0.654352 0.716548
P554	33385	39	45	61	62	71	0	0	0	OVL	C18	513.284853
P555	33495	39	45	49	60	61	62	0	0	OVL	C18	529.453004
P556	33574	39	44	61	62	66	71	0	0	OVL	C18	504.695241
P557	33576	39	44	61	62	63	71	0	0	OVL	C18	504.695241
P558	33592	39	44	59	61	62	71	0	0	OVL	C18	548.904950
P559	33755	39	44	50	59	61	62	71	0	OVL	C18	548.904950
P560	33843	39	44	48	60	61	62	0	0	OVL	C18	500.762361
P561	34027	39	44	45	49	59	61	62	0	OVL	C18	533.800728
P562	34033	39	44	45	47	61	62	70	0	OVL	C18	506.271721
P563	34038	39	44	45	46	48	61	62	0	OVL	C18	503.901079
P564	34075	39	43	60	61	62	71	0	0	OVL	C18	548.593017
P565	34085	39	43	59	61	62	71	0	0	OVL	C18	548.904950
P566	34317	39	43	48	59	61	62	0	0	OVL	C18	500.728002
P567	34410	39	43	47	48	49	0	0	0	VLLV	B7 B8	0.649695 0.712456
P568	34454	39	43	45	61	62	71	0	0	OVL	C18	517.659812
P569	34755	39	42	49	60	61	62	64	0	OVL	C18	549.596336
P570	34927	39	41	59	61	62	63	69	0	OVL	C18	551.026386
P571	34929	39	41	59	60	61	62	0	0	OVL	C18	559.229998
P572	35191	39	41	43	49	61	62	70	0	OVL	C18	506.262356
P573	35309	39	40	59	60	61	62	0	0	OVL	C18	530.480594
P574	35310	39	40	59	60	61	62	69	0	OVL	C18	566.953522
P575	35485	39	40	50	51	52	54	61	0	OVL	C1	294.438428
P576	35530	39	40	48	61	62	71	0	0	OVL	C18	519.636440
P577	35645	39	40	47	48	49	0	0	0	VLLV	B7 B8	0.649733 0.712489
P578	35661	39	40	46	56	61	62	71	0	OVL	C18	522.586625
P579	35746	39	40	44	61	62	67	71	0	OVL	C18	508.988046
P580	35881	39	40	43	61	62	63	71	0	OVL	C18	508.988046
P581	36352	37	44	55	61	62	0	0	0	OVL	C36	536.801665
P582	37059	29	48	61	62	69	0	0	0	OVL	C18	591.137365
P583	37200	27	47	51	0	0	0	0	0	VLLV	B24	0.899952
P584	37201	27	47	51	57	0	0	0	0	VLLV	B24	0.899999
P585	37202	27	46	0	0	0	0	0	0	VLLV	B24	0.899287
P586	37203	27	46	49	70	0	0	0	0	VLLV	B24	0.896929
P587	37204	27	45	70	0	0	0	0	0	VLLV	B24	0.899981
P588	37205	27	45	62	0	0	0	0	0	VLLV	B24	0.899792
P589	37206	27	45	60	0	0	0	0	0	VLLV	B24	0.899750
P590	37208	27	45	51	0	0	0	0	0	VLLV	B24	0.899287
P591	37209	27	45	47	0	0	0	0	0	VLLV	B24	0.896269
P592	37210	27	45	47	49	0	0	0	0	VLLV	B24	0.890404
P593	37218	27	44	49	0	0	0	0	0	VLLV	B24	0.899567
P594	37219	27	44	47	0	0	0	0	0	VLLV	B24	0.899567
P595	37229	27	43	47	0	0	0	0	0	VLLV	B24	0.899567

P596	37230	27	43	46	51	70	0	0	0	VLLV	B24	0.899442
P597	37232	27	42	0	0	0	0	0	0	VLLV	B24	0.899157
P598	37233	27	42	61	0	0	0	0	0	VLLV	B24	0.899659
P599	37234	27	41	0	0	0	0	0	0	VLLV	B24	0.899157
P600	37235	27	41	69	0	0	0	0	0	VLLV	B24	0.899852
P601	37236	27	41	51	0	0	0	0	0	VLLV	B24	0.899157
P602	37247	27	40	42	43	0	0	0	0	VLLV	B24	0.898022
P603	37260	27	39	48	0	0	0	0	0	VLLV	B24	0.899556
P604	37261	27	39	47	0	0	0	0	0	VLLV	B24	0.899556
P605	37262	27	39	43	47	0	0	0	0	VLLV	B24	0.899142
P606	37263	27	39	40	43	47	0	0	0	VLLV	B24	0.898685
P607	37810	22	23	39	48	0	0	0	0	OVL	C21	606.772051
P608	37953	20	61	64	71	0	0	0	0	OVL	C18	500.418218
P609	37971	20	50	61	62	0	0	0	0	OVL	C18	559.831455
P610	37978	20	49	61	71	0	0	0	0	OVL	C18	527.853969
P611	38020	20	41	61	62	69	0	0	0	OVL	C18	671.403451
P612	38025	20	40	61	62	70	0	0	0	OVL	C18	627.658602
P613	38148	18	61	62	0	0	0	0	0	OVL	C20	529.967045
P614	38149	18	60	62	71	0	0	0	0	OVL	C20	546.589491
P615	38160	18	51	61	62	0	0	0	0	OVL	C20	529.967045
P616	38218	17	61	62	66	0	0	0	0	OVL	C18	505.309961
P617	38219	17	61	62	63	0	0	0	0	OVL	C18	505.309961
P618	38232	17	59	61	62	0	0	0	0	OVL	C18	551.803285
P619	38289	17	51	61	62	69	0	0	0	OVL	C18	519.984545
P620	38341	17	48	61	62	0	0	0	0	OVL	C18	527.728293
P621	38369	17	47	61	62	0	0	0	0	OVL	C18	527.728293
P622	38411	17	45	52	61	62	0	0	0	OVL	C18	525.468140
P623	38525	17	43	48	61	62	0	0	0	OVL	C18	533.082349
P624	38560	17	42	60	61	62	0	0	0	OVL	C18	592.979168
P625	38581	17	41	61	62	71	0	0	0	OVL	C18	606.447591
P626	38629	17	40	49	52	61	62	0	0	OVL	C18	533.089328
P627	38721	17	39	47	61	62	0	0	0	OVL	C18	533.089328
P628	39001	16	47	48	50	51	52	0	0	OVL	C1	191.944734
											C3	203.275374
P629	39487	16	17	47	48	0	0	0	0	OVL	C2	201.901148
											C3	222.655367
											C8	204.253673
											C11	183.031341
											C12	321.298040
P630	39488	16	17	44	0	0	0	0	0	OVL	C3	180.317036
											C12	185.484767
P631	39489	16	17	44	54	61	0	0	0	OVL	C3	177.655390
											C12	190.763280
P632	39490	16	17	40	62	67	0	0	0	OVL	C3	176.984786
											C12	191.550797
P633	39491	16	17	40	47	0	0	0	0	OVL	C3	197.757705
											C8	179.551277
											C12	249.953352
P634	39492	16	17	40	43	44	47	49	71	OVL	C2	225.513398
											C3	220.731321
											C4	197.927750
											C8	227.580658
											C11	208.351103
											C12	339.653721
										VLLV	B3	0.884896
											B4	0.897630
P635	39493	16	17	39	69	0	0	0	0	OVL	C3	179.622493
											C12	186.027013
P636	39494	16	17	39	50	0	0	0	0	OVL	C3	179.980354
											C12	185.518411
P637	39518	15	59	61	62	0	0	0	0	OVL	C18	530.299528
P638	39523	15	58	60	61	62	0	0	0	OVL	C18	535.222031
P639	39543	15	54	61	62	70	0	0	0	OVL	C18	503.141991
P640	39567	15	51	61	62	71	0	0	0	OVL	C18	543.895836
P641	39634	15	47	61	62	0	0	0	0	OVL	C18	503.425639
P642	39635	15	47	61	62	71	0	0	0	OVL	C18	585.181654
P643	39686	15	44	61	62	69	0	0	0	OVL	C18	502.764242
P644	39757	15	43	57	59	61	62	0	0	OVL	C18	540.543522
P645	39816	15	42	61	62	69	0	0	0	OVL	C18	535.229109
P646	39818	15	42	59	61	62	0	0	0	OVL	C18	567.757724
P647	39887	15	40	54	61	62	69	0	0	OVL	C18	508.009634
P648	39997	15	39	51	61	62	69	0	0	OVL	C18	502.744731
P649	40012	15	39	47	61	62	0	0	0	OVL	C18	508.301072
P650	40015	15	39	47	50	61	62	0	0	OVL	C18	508.301072
P651	40097	15	31	44	45	61	62	0	0	OVL	C18	505.511733
P652	40120	15	16	43	47	49	61	62	0	OVL	C17	473.493664
P653	40711	14	27	49	0	0	0	0	0	VLLV	B3	0.898747
											B24	0.872570
P654	40734	14	15	48	0	0	0	0	0	VLLV	B9	0.899108
P655	40813	13	40	47	48	0	0	0	0	OVL	C12	237.633284
P656	40841	13	17	0	0	0	0	0	0	VULV	B6	1.104385
P657	40842	13	17	44	47	0	0	0	0	VULV	B6	1.102837
P658	40885	12	47	48	0	0	0	0	0	OVL	C13	227.077709
P659	40948	11	70	0	0	0	0	0	0	NC	-	-
P660	40949	11	68	0	0	0	0	0	0	NC	-	-
P661	40950	11	67	0	0	0	0	0	0	NC	-	-
P662	40951	11	64	0	0	0	0	0	0	NC	-	-
P663	40952	11	63	0	0	0	0	0	0	NC	-	-
P664	40953	11	62	65	0	0	0	0	0	NC	-	-
P665	40954	11	61	69	0	0	0	0	0	NC	-	-
P666	40955	11	60	70	0	0	0	0	0	NC	-	-
P667	40956	11	60	62	0	0	0	0	0	NC	-	-
P668	40957	11	60	61	64	0	0	0	0	NC	-	-
P669	40958	11	59	70	0	0	0	0	0	NC	-	-
P670	40959	11	59	62	70	0	0	0	0	NC	-	-
P671	40960	11	57	71	0	0	0	0	0	NC	-	-
P672	40961	11	55	0	0	0	0	0	0	NC	-	-
P673	40962	11	55	69	71	0	0	0	0	NC	-	-
P674	40963	11	52	62	0	0	0	0	0	NC	-	-
P675	40964	11	52	61	0	0	0	0	0	NC	-	-
P676	40965	11	50	60	0	0	0	0	0	NC	-	-
P677	40966	11	50	52	0	0	0	0	0	NC	-	-
P678	40967	11	49	70	0	0	0	0	0	NC	-	-
P679	40968	11	48	0	0	0	0	0	0	NC	-	-
P680	40969	11	47	61	0	0	0	0	0	NC	-	-
P681	40970	11	47	61	71	0	0	0	0	NC	-	-
P682	40971	11	47	50	0	0	0	0	0	NC	-	-
P683	40972	11	46	49	70	0	0	0	0	NC	-	-
P684	40973	11	45	61	71	0	0	0	0	NC	-	-

P685	40974	11	45	60	0	0	0	0	0	NC	-	-
P686	40975	11	44	71	0	0	0	0	0	NC	-	-
P687	40976	11	44	61	0	0	0	0	0	NC	-	-
P688	40977	11	44	58	0	0	0	0	0	NC	-	-
P689	40978	11	44	52	0	0	0	0	0	NC	-	-
P690	40979	11	44	51	0	0	0	0	0	NC	-	-
P691	40980	11	44	50	0	0	0	0	0	NC	-	-
P692	40981	11	44	50	55	71	0	0	0	NC	-	-
P693	40982	11	44	47	50	0	0	0	0	NC	-	-
P694	40983	11	43	64	0	0	0	0	0	NC	-	-
P695	40984	11	43	61	0	0	0	0	0	NC	-	-
P696	40985	11	43	59	70	0	0	0	0	NC	-	-
P697	40986	11	43	49	0	0	0	0	0	NC	-	-
P698	40987	11	43	47	48	0	0	0	0	NC	-	-
P699	40988	11	43	46	61	0	0	0	0	NC	-	-
P700	40989	11	43	45	0	0	0	0	0	NC	-	-
P701	40990	11	43	44	49	0	0	0	0	NC	-	-
P702	40991	11	41	0	0	0	0	0	0	NC	-	-
P703	40992	11	41	70	0	0	0	0	0	NC	-	-
P704	40993	11	41	47	61	0	0	0	0	NC	-	-
P705	40994	11	40	69	0	0	0	0	0	NC	-	-
P706	40995	11	40	61	62	0	0	0	0	NC	-	-
P707	40996	11	40	57	61	62	0	0	0	NC	-	-
P708	40997	11	40	55	0	0	0	0	0	NC	-	-
P709	40998	11	40	50	57	61	69	0	0	NC	-	-
P710	40999	11	40	47	69	0	0	0	0	NC	-	-
P711	41000	11	40	46	0	0	0	0	0	NC	-	-
P712	41001	11	40	44	48	0	0	0	0	NC	-	-
P713	41002	11	40	44	47	67	0	0	0	NC	-	-
P714	41003	11	40	41	0	0	0	0	0	NC	-	-
P715	41004	11	39	60	0	0	0	0	0	NC	-	-
P716	41005	11	39	60	61	0	0	0	0	NC	-	-
P717	41006	11	39	51	0	0	0	0	0	NC	-	-
P718	41007	11	39	49	0	0	0	0	0	NC	-	-
P719	41008	11	39	44	70	0	0	0	0	NC	-	-
P720	41009	11	39	43	49	0	0	0	0	NC	-	-
P721	41010	11	39	41	0	0	0	0	0	NC	-	-
P722	41011	11	39	40	0	0	0	0	0	NC	-	-
P723	41012	11	16	0	0	0	0	0	0	NC	-	-
P724	41013	11	14	0	0	0	0	0	0	NC	-	-
P725	41014	10	69	71	0	0	0	0	0	VLLV	B6	0.856108
P726	41015	10	66	69	0	0	0	0	0	VLLV	B6	0.856108
P727	41016	10	64	0	0	0	0	0	0	VLLV	B6	0.856108
P728	41017	10	62	70	0	0	0	0	0	VLLV	B6	0.856108
P729	41018	10	62	69	0	0	0	0	0	VLLV	B6	0.856108
P730	41019	10	61	71	0	0	0	0	0	VLLV	B6	0.856108
P731	41020	10	61	62	0	0	0	0	0	VLLV	B6	0.856108
P732	41021	10	60	69	0	0	0	0	0	VLLV	B6	0.856108
P733	41022	10	59	70	0	0	0	0	0	VLLV	B6	0.856108
P734	41023	10	59	67	0	0	0	0	0	VLLV	B6	0.856108
P735	41024	10	59	62	0	0	0	0	0	VLLV	B6	0.856108
P736	41025	10	58	61	0	0	0	0	0	VLLV	B6	0.856108
P737	41026	10	56	62	0	0	0	0	0	VLLV	B6	0.856108
P738	41027	10	56	61	0	0	0	0	0	VLLV	B6	0.856108
P739	41028	10	54	63	0	0	0	0	0	VLLV	B6	0.856108
P740	41029	10	54	61	0	0	0	0	0	VLLV	B6	0.856108
P741	41030	10	52	67	0	0	0	0	0	VLLV	B6	0.856108
P742	41031	10	52	62	0	0	0	0	0	VLLV	B6	0.856108
P743	41032	10	52	59	0	0	0	0	0	VLLV	B6	0.856108
P744	41033	10	51	70	0	0	0	0	0	VLLV	B6	0.856108
P745	41034	10	51	67	0	0	0	0	0	VLLV	B6	0.856108
P746	41035	10	51	60	0	0	0	0	0	VLLV	B6	0.856108
P747	41036	10	51	52	61	0	0	0	0	VLLV	B6	0.856108
P748	41037	10	50	69	0	0	0	0	0	VLLV	B6	0.856108
P749	41038	10	50	58	0	0	0	0	0	VLLV	B6	0.856108
P750	41039	10	50	52	0	0	0	0	0	VLLV	B6	0.856108
P751	41040	10	50	52	60	0	0	0	0	VLLV	B6	0.856108
P752	41041	10	49	62	0	0	0	0	0	VLLV	B6	0.856108
P753	41042	10	49	61	0	0	0	0	0	VLLV	B6	0.856108
P754	41043	10	49	60	61	63	0	0	0	VLLV	B6	0.856108
P755	41044	10	49	59	0	0	0	0	0	VLLV	B6	0.856108
P756	41045	10	48	70	0	0	0	0	0	VLLV	B6	0.856108
P757	41046	10	48	68	0	0	0	0	0	VLLV	B6	0.856108
P758	41047	10	48	67	0	0	0	0	0	VLLV	B6	0.856108
P759	41048	10	48	62	70	0	0	0	0	VLLV	B6	0.856108
P760	41049	10	48	51	0	0	0	0	0	VLLV	B6	0.856108
P761	41050	10	47	63	0	0	0	0	0	VLLV	B6	0.856108
P762	41051	10	47	62	0	0	0	0	0	VLLV	B6	0.856108
P763	41052	10	47	61	0	0	0	0	0	VLLV	B6	0.856108
P764	41053	10	47	61	62	0	0	0	0	VLLV	B6	0.856108
P765	41054	10	47	60	69	0	0	0	0	VLLV	B6	0.856108
P766	41055	10	47	52	0	0	0	0	0	VLLV	B6	0.856108
P767	41056	10	47	52	62	0	0	0	0	VLLV	B6	0.856108
P768	41057	10	47	50	0	0	0	0	0	VLLV	B6	0.856108
P769	41058	10	46	59	69	0	0	0	0	VLLV	B6	0.856108
P770	41059	10	46	50	51	61	0	0	0	VLLV	B6	0.856108
P771	41060	10	46	50	51	59	71	0	0	VLLV	B6	0.856108
P772	41061	10	45	49	62	0	0	0	0	VLLV	B6	0.856108
P773	41062	10	45	48	0	0	0	0	0	VLLV	B6	0.856108
P774	41063	10	44	70	0	0	0	0	0	VLLV	B6	0.856108
P775	41064	10	44	69	0	0	0	0	0	VLLV	B6	0.856108
P776	41065	10	44	68	0	0	0	0	0	VLLV	B6	0.856108
P777	41066	10	44	67	0	0	0	0	0	VLLV	B6	0.856108
P778	41067	10	44	66	0	0	0	0	0	VLLV	B6	0.856108
P779	41068	10	44	65	70	0	0	0	0	VLLV	B6	0.856108
P780	41069	10	44	62	69	0	0	0	0	VLLV	B6	0.856108
P781	41070	10	44	60	0	0	0	0	0	VLLV	B6	0.856108
P782	41071	10	44	58	0	0	0	0	0	VLLV	B6	0.856108
P783	41072	10	44	57	61	0	0	0	0	VLLV	B6	0.856108
P784	41073	10	44	56	61	62	66	0	0	VLLV	B6	0.856108
P785	41074	10	44	52	0	0	0	0	0	VLLV	B6	0.856108
P786	41075	10	44	49	0	0	0	0	0	VLLV	B6	0.856108
P787	41076	10	44	47	61	0	0	0	0	VLLV	B6	0.856108
P788	41077	10	43	70	0	0	0	0	0	VLLV	B6	0.856108
P789	41078	10	43	66	0	0	0	0	0	VLLV	B6	0.856108
P790	41079	10	43	65	71	0	0	0	0	VLLV	B6	0.856108
P791	41080	10	43	62	71	0	0	0	0	VLLV	B6	0.856108
P792	41081	10	43	61	66	0	0	0	0	VLLV	B6	0.856108
P793	41082	10	43	58	0	0	0	0	0	VLLV	B6	0.856108

P794	41083	10	43	57	0	0	0	0	0	VLLV	B6	0.856108
P795	41084	10	43	56	61	71	0	0	0	VLLV	B6	0.856108
P796	41085	10	43	55	0	0	0	0	0	VLLV	B6	0.856108
P797	41086	10	43	51	69	0	0	0	0	VLLV	B6	0.856108
P798	41087	10	43	51	64	0	0	0	0	VLLV	B6	0.856108
P799	41088	10	43	50	0	0	0	0	0	VLLV	B6	0.856108
P800	41089	10	43	50	69	0	0	0	0	VLLV	B6	0.856108
P801	41090	10	43	48	62	0	0	0	0	VLLV	B6	0.856108
P802	41091	10	43	46	71	0	0	0	0	VLLV	B6	0.856108
P803	41092	10	43	44	64	0	0	0	0	VLLV	B6	0.856108
P804	41093	10	43	44	61	0	0	0	0	VLLV	B6	0.856108
P805	41094	10	43	44	59	0	0	0	0	VLLV	B6	0.856108
P806	41095	10	42	59	71	0	0	0	0	VLLV	B6	0.856108
P807	41096	10	42	47	0	0	0	0	0	VLLV	B6	0.856108
P808	41097	10	41	71	0	0	0	0	0	VLLV	B6	0.856108
P809	41098	10	41	70	0	0	0	0	0	VLLV	B6	0.856108
P810	41099	10	41	69	0	0	0	0	0	VLLV	B6	0.856108
P811	41100	10	41	62	69	0	0	0	0	VLLV	B6	0.856108
P812	41101	10	41	61	0	0	0	0	0	VLLV	B6	0.856108
P813	41102	10	41	51	69	70	0	0	0	VLLV	B6	0.856108
P814	41103	10	41	47	0	0	0	0	0	VLLV	B6	0.856108
P815	41104	10	41	44	69	0	0	0	0	VLLV	B6	0.856108
P816	41105	10	41	44	49	0	0	0	0	VLLV	B6	0.856108
P817	41106	10	41	43	0	0	0	0	0	VLLV	B6	0.856108
P818	41107	10	40	70	0	0	0	0	0	VLLV	B6	0.856108
P819	41108	10	40	62	70	0	0	0	0	VLLV	B6	0.856108
P820	41109	10	40	61	66	0	0	0	0	VLLV	B6	0.856108
P821	41110	10	40	60	0	0	0	0	0	VLLV	B6	0.856108
P822	41111	10	40	55	62	0	0	0	0	VLLV	B6	0.856108
P823	41112	10	40	55	61	0	0	0	0	VLLV	B6	0.856108
P824	41113	10	40	51	59	60	0	0	0	VLLV	B6	0.856108
P825	41114	10	40	50	65	0	0	0	0	VLLV	B6	0.856108
P826	41115	10	40	50	64	0	0	0	0	VLLV	B6	0.856108
P827	41116	10	40	50	57	0	0	0	0	VLLV	B6	0.856108
P828	41117	10	40	47	51	0	0	0	0	VLLV	B6	0.856108
P829	41118	10	40	47	49	51	0	0	0	VLLV	B6	0.856108
P830	41119	10	40	46	62	0	0	0	0	VLLV	B6	0.856108
P831	41120	10	40	44	0	0	0	0	0	VLLV	B6	0.856108
P832	41121	10	40	44	48	0	0	0	0	VLLV	B6	0.856108
P833	41122	10	40	43	61	0	0	0	0	VLLV	B6	0.856108
P834	41123	10	40	43	51	0	0	0	0	VLLV	B6	0.856108
P835	41124	10	40	42	0	0	0	0	0	VLLV	B6	0.856108
P836	41125	10	40	41	0	0	0	0	0	VLLV	B6	0.856108
P837	41126	10	39	71	0	0	0	0	0	VLLV	B6	0.856108
P838	41127	10	39	70	0	0	0	0	0	VLLV	B6	0.856108
P839	41128	10	39	69	70	0	0	0	0	VLLV	B6	0.856108
P840	41129	10	39	62	70	0	0	0	0	VLLV	B6	0.856108
P841	41130	10	39	59	0	0	0	0	0	VLLV	B6	0.856108
P842	41131	10	39	57	0	0	0	0	0	VLLV	B6	0.856108
P843	41132	10	39	57	71	0	0	0	0	VLLV	B6	0.856108
P844	41133	10	39	55	0	0	0	0	0	VLLV	B6	0.856108
P845	41134	10	39	54	59	0	0	0	0	VLLV	B6	0.856108
P846	41135	10	39	52	0	0	0	0	0	VLLV	B6	0.856108
P847	41136	10	39	51	0	0	0	0	0	VLLV	B6	0.856108
P848	41137	10	39	51	60	0	0	0	0	VLLV	B6	0.856108
P849	41138	10	39	50	61	62	0	0	0	VLLV	B6	0.856108
P850	41139	10	39	49	0	0	0	0	0	VLLV	B6	0.856108
P851	41140	10	39	48	0	0	0	0	0	VLLV	B6	0.856108
P852	41141	10	39	45	69	0	0	0	0	VLLV	B6	0.856108
P853	41142	10	39	44	71	0	0	0	0	VLLV	B6	0.856108
P854	41143	10	39	44	48	0	0	0	0	VLLV	B6	0.856108
P855	41144	10	39	43	66	0	0	0	0	VLLV	B6	0.856108
P856	41145	10	39	43	58	61	0	0	0	VLLV	B6	0.856108
P857	41146	10	39	43	52	0	0	0	0	VLLV	B6	0.856108
P858	41147	10	39	42	59	0	0	0	0	VLLV	B6	0.856108
P859	41148	10	39	42	52	0	0	0	0	VLLV	B6	0.856108
P860	41149	10	39	40	71	0	0	0	0	VLLV	B6	0.856108
P861	41150	10	39	40	61	0	0	0	0	VLLV	B6	0.856108
P862	41151	10	39	40	44	71	0	0	0	VLLV	B6	0.856108
P863	41152	10	20	0	0	0	0	0	0	VLLV	B6	0.856108
P864	41153	10	16	62	0	0	0	0	0	VLLV	B6	0.856108
P865	41154	10	15	55	0	0	0	0	0	VLLV	B6	0.856108
P866	41936	7	23	0	0	0	0	0	0	OVL	C22 C29	522.175685 703.458735
P867	41937	7	23	43	0	0	0	0	0	OVL	C22 C29	521.192306 703.458735
P868	41938	7	22	0	0	0	0	0	0	OVL	C23	592.264682
P869	41939	7	22	50	0	0	0	0	0	OVL	C23	592.264682
P870	41948	7	17	40	0	0	0	0	0	OVL	C23	511.760853
P871	41949	7	17	39	43	49	0	0	0	OVL	C23	522.195446
P872	41956	7	16	41	47	0	0	0	0	OVL	C17	419.468054
P873	41963	7	15	39	43	0	0	0	0	OVL	C23	507.049268
P874	41967	7	14	45	0	0	0	0	0	VLLV	B3	0.899229
P875	41973	7	11	0	0	0	0	0	0	NC	-	-
P876	42055	5	67	0	0	0	0	0	0	VULV	B6	1.113631
P877	42056	5	66	0	0	0	0	0	0	VULV	B6	1.113631
P878	42057	5	64	0	0	0	0	0	0	VULV	B6	1.113631
P879	42058	5	63	70	0	0	0	0	0	VULV	B6	1.114489
P880	42059	5	62	69	0	0	0	0	0	VULV	B6	1.113339
P881	42060	5	62	63	0	0	0	0	0	VULV	B6	1.113148
P882	42061	5	61	71	0	0	0	0	0	VULV	B6	1.112566
P883	42062	5	60	71	0	0	0	0	0	VULV	B6	1.114591
P884	42063	5	60	62	0	0	0	0	0	VULV	B6	1.112294
P885	42064	5	60	61	0	0	0	0	0	VULV	B6	1.112307
P886	42065	5	59	71	0	0	0	0	0	VULV	B6	1.114564
P887	42066	5	59	70	0	0	0	0	0	VULV	B6	1.114483
P888	42067	5	59	62	0	0	0	0	0	VULV	B6	1.112190
P889	42068	5	59	61	0	0	0	0	0	VULV	B6	1.112217
P890	42069	5	57	0	0	0	0	0	0	VULV	B6	1.113464
P891	42070	5	57	68	0	0	0	0	0	VULV	B6	1.113680
P892	42071	5	57	62	0	0	0	0	0	VULV	B6	1.113374
P893	42072	5	57	61	0	0	0	0	0	VULV	B6	1.113392
P894	42073	5	56	0	0	0	0	0	0	VULV	B6	1.113464
P895	42074	5	56	66	0	0	0	0	0	VULV	B6	1.113680
P896	42075	5	56	60	70	0	0	0	0	VULV	B6	1.114487
P897	42076	5	55	0	0	0	0	0	0	VULV	B6	1.113464
P898	42077	5	54	62	0	0	0	0	0	VULV	B6	1.113374
P899	42078	5	54	61	0	0	0	0	0	VULV	B6	1.113392
P900	42079	5	52	69	0	0	0	0	0	VULV	B6	1.114387

P901	42080	5	52	59	0	0	0	0	0	VULV	B6	1.113920
P902	42081	5	52	59	63	0	0	0	0	VULV	B6	1.113949
P903	42082	5	51	71	0	0	0	0	0	VULV	B6	1.115008
P904	42083	5	51	70	0	0	0	0	0	VULV	B6	1.114387
P905	42084	5	51	69	0	0	0	0	0	VULV	B6	1.114387
P906	42085	5	51	61	71	0	0	0	0	VULV	B6	1.112566
P907	42086	5	51	60	0	0	0	0	0	VULV	B6	1.113938
P908	42087	5	51	55	62	0	0	0	0	VULV	B6	1.113374
P909	42088	5	50	71	0	0	0	0	0	VULV	B6	1.115008
P910	42089	5	50	63	0	0	0	0	0	VULV	B6	1.113631
P911	42090	5	50	62	0	0	0	0	0	VULV	B6	1.113444
P912	42091	5	50	58	61	0	0	0	0	VULV	B6	1.113392
P913	42092	5	50	54	70	0	0	0	0	VULV	B6	1.114418
P914	42093	5	49	66	0	0	0	0	0	VULV	B6	1.111253
P915	42094	5	49	65	0	0	0	0	0	VULV	B6	1.111253
P916	42095	5	49	62	0	0	0	0	0	VULV	B6	1.110370
P917	42096	5	49	51	0	0	0	0	0	VULV	B6	1.111105
P918	42097	5	49	50	0	0	0	0	0	VULV	B6	1.111105
P919	42098	5	48	56	0	0	0	0	0	VULV	B6	1.111147
P920	42099	5	48	54	0	0	0	0	0	VULV	B6	1.111147
P921	42100	5	48	49	0	0	0	0	0	VULV	B6	1.104726
P922	42101	5	47	61	0	0	0	0	0	VULV	B6	1.110400
P923	42102	5	47	49	0	0	0	0	0	VULV	B6	1.104726
P924	42103	5	47	48	0	0	0	0	0	VULV	B6	1.104726
P925	42104	5	46	0	0	0	0	0	0	VULV	B6	1.113389
P926	42105	5	45	61	71	0	0	0	0	VULV	B6	1.111035
P927	42106	5	45	49	59	0	0	0	0	VULV	B6	1.110351
P928	42107	5	44	69	0	0	0	0	0	VULV	B6	1.114443
P929	42108	5	44	66	0	0	0	0	0	VULV	B6	1.113695
P930	42109	5	44	62	0	0	0	0	0	VULV	B6	1.113388
P931	42110	5	44	62	70	0	0	0	0	VULV	B6	1.113257
P932	42111	5	44	61	69	0	0	0	0	VULV	B6	1.113274
P933	42112	5	44	60	0	0	0	0	0	VULV	B6	1.113972
P934	42113	5	44	58	71	0	0	0	0	VULV	B6	1.115019
P935	42114	5	44	57	0	0	0	0	0	VULV	B6	1.113539
P936	42115	5	44	55	0	0	0	0	0	VULV	B6	1.113539
P937	42116	5	44	51	67	0	0	0	0	VULV	B6	1.113695
P938	42117	5	44	49	0	0	0	0	0	VULV	B6	1.111119
P939	42118	5	44	48	0	0	0	0	0	VULV	B6	1.111119
P940	42119	5	43	69	70	0	0	0	0	VULV	B6	1.114969
P941	42120	5	43	64	0	0	0	0	0	VULV	B6	1.113695
P942	42121	5	43	59	70	0	0	0	0	VULV	B6	1.114484
P943	42122	5	43	57	71	0	0	0	0	VULV	B6	1.115019
P944	42123	5	43	56	0	0	0	0	0	VULV	B6	1.113539
P945	42124	5	43	55	59	0	0	0	0	VULV	B6	1.113953
P946	42125	5	43	51	0	0	0	0	0	VULV	B6	1.113480
P947	42126	5	43	51	61	62	0	0	0	VULV	B6	1.108607
P948	42127	5	43	49	61	0	0	0	0	VULV	B6	1.110276
P949	42128	5	43	47	66	0	0	0	0	VULV	B6	1.111251
P950	42129	5	43	44	71	0	0	0	0	VULV	B6	1.115034
P951	42130	5	42	48	0	0	0	0	0	VULV	B6	1.110600
P952	42131	5	42	47	0	0	0	0	0	VULV	B6	1.110600
P953	42132	5	41	62	0	0	0	0	0	VULV	B6	1.112411
P954	42133	5	41	58	59	0	0	0	0	VULV	B6	1.113504
P955	42134	5	40	68	0	0	0	0	0	VULV	B6	1.113704
P956	42135	5	40	66	0	0	0	0	0	VULV	B6	1.113704
P957	42136	5	40	62	71	0	0	0	0	VULV	B6	1.112445
P958	42137	5	40	57	0	0	0	0	0	VULV	B6	1.113549
P959	42138	5	40	52	70	0	0	0	0	VULV	B6	1.114452
P960	42139	5	40	51	0	0	0	0	0	VULV	B6	1.113489
P961	42140	5	40	51	61	0	0	0	0	VULV	B6	1.113416
P962	42141	5	40	49	0	0	0	0	0	VULV	B6	1.111128
P963	42142	5	40	46	0	0	0	0	0	VULV	B6	1.113285
P964	42143	5	40	44	0	0	0	0	0	VULV	B6	1.113544
P965	42144	5	40	44	61	0	0	0	0	VULV	B6	1.113338
P966	42145	5	40	44	52	0	0	0	0	VULV	B6	1.113544
P967	42146	5	40	44	51	0	0	0	0	VULV	B6	1.113544
P968	42147	5	40	44	50	0	0	0	0	VULV	B6	1.113544
P969	42148	5	40	44	48	70	0	0	0	VULV	B6	1.111920
P970	42149	5	40	43	61	0	0	0	0	VULV	B6	1.113338
P971	42150	5	40	43	49	0	0	0	0	VULV	B6	1.111116
P972	42151	5	40	43	48	61	0	0	0	VULV	B6	1.110134
P973	42152	5	40	43	46	0	0	0	0	VULV	B6	1.113148
P974	42153	5	40	43	44	62	0	0	0	VULV	B6	1.113208
P975	42154	5	40	41	0	0	0	0	0	VULV	B6	1.113321
P976	42155	5	39	66	0	0	0	0	0	VULV	B6	1.113704
P977	42156	5	39	60	71	0	0	0	0	VULV	B6	1.114576
P978	42157	5	39	60	61	0	0	0	0	VULV	B6	1.112208
P979	42158	5	39	57	62	63	0	0	0	VULV	B6	1.112989
P980	42159	5	39	57	58	59	0	0	0	VULV	B6	1.113965
P981	42160	5	39	52	62	0	0	0	0	VULV	B6	1.113395
P982	42161	5	39	52	57	0	0	0	0	VULV	B6	1.113549
P983	42162	5	39	51	59	0	0	0	0	VULV	B6	1.113953
P984	42163	5	39	49	54	0	0	0	0	VULV	B6	1.111166
P985	42164	5	39	49	51	62	0	0	0	VULV	B6	1.110251
P986	42165	5	39	47	62	0	0	0	0	VULV	B6	1.110251
P987	42166	5	39	45	48	64	69	0	0	VULV	B6	1.110895
P988	42167	5	39	44	61	62	0	0	0	VULV	B6	1.108362
P989	42168	5	39	44	47	0	0	0	0	VULV	B6	1.111116
P990	42169	5	39	43	0	0	0	0	0	VULV	B6	1.113544
P991	42170	5	39	43	69	0	0	0	0	VULV	B6	1.114483
P992	42171	5	39	43	62	69	0	0	0	VULV	B6	1.113156
P993	42172	5	39	43	48	0	0	0	0	VULV	B6	1.111116
P994	42173	5	39	42	0	0	0	0	0	VULV	B6	1.113321
P995	42174	5	39	40	0	0	0	0	0	VULV	B6	1.113552
P996	42175	5	39	40	47	0	0	0	0	VULV	B6	1.111125
P997	42176	5	39	40	44	0	0	0	0	VULV	B6	1.113582
P998	42177	5	36	44	0	0	0	0	0	VULV	B6	1.113388
P999	42178	5	34	0	0	0	0	0	0	VULV	B6	1.113350
P1000	42179	5	16	49	0	0	0	0	0	VULV	B6	1.123691
P1001	42180	5	15	61	0	0	0	0	0	VULV	B6	1.114923

Annex 8

State ID	P4		P5		P6		P9		P10	
Bus	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	1.5353	0.0000	1.5353	0.0000	1.5353	0.0000	1.3931	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3126	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0584	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4162	0.0000
7	0.1049	0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	0.0000	0.2810	0.2956	0.0000	0.2956	0.0000	0.2956	0.0000	0.0662	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4577	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0210	0.0000
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.7414	0.0000	0.7414	0.0000	0.7414	0.0000	1.7654	0.0000
15	0.0000	0.0000	1.4442	0.0000	1.4442	0.0000	1.4442	0.0000	0.4262	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18	0.0000	0.0000	3.2015	0.0000	3.2015	0.0000	3.2015	0.0000	1.6587	0.0000
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1282	0.0000
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total (pu)	0.1049	0.5310	7.2180	0.0000	7.2180	0.0000	7.2180	0.0000	7.7037	0.0000
	0.6359		7.2180		7.2180		7.2180		7.7037	

P11		P12		P13		P14		P15	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	1.3931	0.0000	1.8000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3126	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0584	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0035	0.4162	0.0000	0.0000	0.0000	0.0000	0.0035
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0662	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4577	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.8203	0.0000	0.0000	0.0000	1.7654	0.0000	0.5844	0.0000	0.0000	0.0000
1.5705	0.0000	0.0000	0.0000	0.4262	0.0000	2.8949	0.0000	0.0000	0.0000
0.9994	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5783	0.0661	0.0000	0.0000	1.6587	0.0000	2.4921	0.2323	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.1282	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.7685	0.0661	0.0000	0.0035	7.7037	0.0000	7.7713	0.2323	0.0000	0.0035
7.8346		0.0035		7.7037		8.0036		0.0035	

P17		P19		P23		P25		P29	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.6371	0.0000	1.4752	0.0000	1.4752	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5254	0.0000	0.5254	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3288	0.0000	0.3288	0.0000
0.0000	0.0089	0.0000	0.0089	0.0000	0.0000	0.0166	0.0000	0.0166	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0770	0.0000	0.0770	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4678	0.0000	0.4678	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0033	0.0000	0.0033	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8479	0.0000	1.8479	0.0000
0.0000	0.0000	0.0000	0.0000	2.0824	0.4363	0.4113	0.0000	0.4113	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.1559	0.6800	1.6146	0.0000	1.6146	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1553	0.0000	0.1553	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0089	5.8753	1.1163	6.9231	0.0000	6.9231	0.0000
0.0089		0.0089		6.9916		6.9231		6.9231	

P30		P34		P38		P40		P41	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6865	0.0000	1.6865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1206	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2500	0.0000
0.0000	0.0000	0.0000	0.0000	0.5550	0.0000	0.1828	0.0000	0.5787	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.7500	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.1951	0.0000	0.0000
0.0305	0.0000	0.0305	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9664	0.0000	1.9664	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	3.3300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.0134	0.0000	7.0134	0.0000	0.5550	0.0000	4.7033	0.1951	1.8287	0.0000
7.0134		7.0134		0.5550		4.8984		1.8287	

P42		P43		P44		P45		P46	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2079	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1070	0.2500	0.1070	0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2839	0.0000	0.2839	0.5713	0.0000	0.0000	0.2380	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2412	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5806	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4575	2.6500	0.4200
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6235	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1070	0.5339	0.1070	0.5339	0.5713	0.0000	2.6235	0.6955	4.6797	0.4200
0.6409		0.6409		0.5713		3.3189		5.0998	

P47		P51		P52		P56		P57	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5674	0.0000	1.4228	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3575	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.1374	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4188	0.0000	0.0000	0.1232	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2380	0.3680	0.0000	0.0672	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4721	0.0000	0.0000	0.0000	1.6095	0.0000
0.0000	0.0000	0.0000	0.0000	0.0332	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.4575	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.1503
0.0000	0.0000	0.8705	0.0000	1.7736	0.0000	0.0000	0.0000	0.0000	0.0000
2.6235	0.0000	1.4293	0.0000	0.4269	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.1766	0.0000	1.6583	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.1312	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6235	0.6955	7.4119	0.0000	7.8990	0.0000	0.0000	0.1232	4.2595	0.1503
3.3189		7.4119		7.8990		0.1232		4.4097	

P59		P60		P61		P65		P66	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4005	0.0000	1.2325	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3579	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1317	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4062	0.0000	0.8495	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2500	0.0000
0.9878	0.0000	0.0000	0.0000	0.1490	0.0000	0.0000	0.0000	0.5625	0.0000
0.3170	0.0000	0.0000	0.0000	0.0000	0.0000	0.0666	0.0979	0.0000	0.0000
0.0000	0.0000	0.0311	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.1498	0.0000	0.0000	0.0000	2.6500	0.5400	0.0000	0.0000
1.7007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3900	0.0000	0.0000
0.3719	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5892	0.0000	2.0095	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0654	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.3282	0.0000	6.2723	0.0000	0.1490	0.0000	2.7166	1.0279	1.8125	0.0000
7.3282		6.2723		0.1490		3.7444		1.8125	

P67		P68		P72		P73		P77	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6925	0.0000	0.0000	0.0000	0.0000	0.0000	0.3671	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.1427	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5281	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3021	0.0000
1.6639	0.0000	3.1700	0.0000	0.0000	0.0000	0.0000	0.0000	1.6316	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3242	0.0000	1.1873	0.0000	0.0000	0.0000	2.4977	0.4787	2.5808	0.0109
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9946	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.2088	0.0000	4.3573	0.0000	0.0000	0.1427	2.8648	0.4787	9.3090	0.0109
7.2088		4.3573		0.1427		3.3435		9.3200	

P78		P79		P80		P81		P86	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.5674	0.0000	1.5674	0.0000	1.7261	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3680	0.0000	0.3680	0.0000	0.0000	0.0000	0.0000	0.1366
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3229
0.5497	0.0000	0.8705	0.0000	0.8705	0.0000	0.0000	0.0000	0.0000	0.0000
3.1700	0.0000	1.4293	0.0000	1.4293	0.0000	2.9476	0.0000	2.8845	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.2764	0.4027	3.1766	0.0000	3.1766	0.0000	3.3300	0.4507	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.7961	0.4027	7.4119	0.0000	7.4119	0.0000	8.0037	0.4507	2.8845	0.4595
9.1988		7.4119		7.4119		8.4544		3.3440	

P91		P92		P93		P99		P100	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5534	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3039	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0487	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0641	0.0000	0.0035	0.7925	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0721	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5976	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7869	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.7625	0.0000	1.7232	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0294	0.0000	2.9121	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.7323	0.0000	3.3300	0.0991
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0641	0.0000	0.0035	9.6793	0.0000	9.7653	0.0991
0.0089		0.0641		0.0035		9.6793		9.8644	

P101		P102		P103		P104		P105	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5326	0.0000	1.3951	0.0000	1.8000	0.0000	1.5311	0.0000	0.0000	0.0000
0.3393	0.0000	0.3115	0.0000	0.0000	0.0000	0.0135	0.0000	0.0000	0.0000
0.0000	0.0000	0.0570	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4561	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2500	0.0000
0.1556	0.0000	0.9918	0.0000	0.1120	0.0000	0.5740	0.0000	0.1578	0.0000
1.7500	0.0000	0.4872	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3048	0.0000	0.1041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7595	0.0000	1.7370	0.0000	0.6384	0.0000	1.7052	0.0000	0.0000	0.0000
0.0000	0.0000	0.3983	0.0000	2.1630	0.0000	2.0334	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1470	0.0000	1.6340	0.0000	2.1106	0.3362	3.3254	0.0000	0.0000	0.0000
0.0000	0.0000	1.0947	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.6387	0.0000	8.6667	0.0000	6.8240	0.3362	9.1827	0.0000	1.4078	0.0000
8.6387		8.6667		7.1603		9.1827		1.4078	

P106		P107		P108		P109		P110	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5776	0.0000	1.5776	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5147	0.0000	0.5147	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2999	0.0000	0.2999	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1046	0.2500	0.1686	0.2500	0.1686	0.2500	0.0000	0.0000	0.0000	0.0000
0.0000	0.2818	0.0000	0.2332	0.0000	0.2332	0.0972	0.0000	0.0972	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3396	0.0000	1.3396	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5110	0.0000	0.5110	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9400	0.0000	1.9400	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4002	0.0000	0.4002	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.6595	0.0000	1.6595	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5346	0.0000	0.5346	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1046	0.5318	0.1686	0.4832	0.1686	0.4832	8.8742	0.0000	8.8742	0.0000
0.6365		0.6518		0.6518		8.8742		8.8742	

P112		P113		P114		P115		P116	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5674	0.0000	0.0000	0.0000	1.3989	0.0000	0.0000	0.0000	1.4228	0.0000
0.0000	0.0000	0.0000	0.0000	0.3685	0.0000	0.0000	0.0000	0.3575	0.0000
0.0000	0.0000	0.0000	0.0000	0.1279	0.0000	0.0000	0.0000	0.1374	0.0000
0.0000	0.0000	0.0000	0.0000	0.3035	0.0000	0.0000	0.0000	0.4188	0.0000
0.0000	0.0000	0.1054	0.2500	0.0000	0.0000	0.1054	0.2500	0.0000	0.0000
0.3680	0.0000	0.0000	0.2878	0.0616	0.0000	0.0000	0.2878	0.0672	0.0000
0.0000	0.0000	0.0000	0.0000	0.4173	0.0000	0.0000	0.0000	0.4721	0.0000
0.0000	0.0000	0.0000	0.0000	0.1129	0.0000	0.0000	0.0000	0.0332	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.8705	0.0000	0.0000	0.0000	1.7122	0.0000	0.0000	0.0000	1.7736	0.0000
1.4293	0.0000	0.0000	0.0000	0.4385	0.0000	0.0000	0.0000	0.4269	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1766	0.0000	0.0000	0.0000	1.8383	0.0000	0.0000	0.0000	1.6583	0.0000
0.0000	0.0000	0.0000	0.0000	0.0663	0.0000	0.0000	0.0000	1.1312	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.4119	0.0000	0.1054	0.5378	6.8460	0.0000	0.1054	0.5378	7.8990	0.0000
7.4119		0.6432		6.8460		0.6432		7.8990	

P117		P118		P119		P120		P121	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4005	0.0000	1.4005	0.0000	1.7085	0.0000	1.8000	0.0000	1.7085	0.0000
0.3579	0.0000	0.3579	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1317	0.0000	0.1317	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4062	0.0000	0.4062	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9878	0.0000	0.9878	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3170	0.0000	0.3170	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7007	0.0000	1.7007	0.0000	0.4887	0.0000	0.8246	0.0000	0.4887	0.0000
0.3719	0.0000	0.3719	0.0000	1.6813	0.0000	2.0271	0.0000	1.6813	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5892	0.0000	1.5892	0.0000	3.3300	0.0000	3.3300	0.1342	3.3300	0.0000
0.0654	0.0000	0.0654	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.3282	0.0000	7.3282	0.0000	7.2085	0.0000	7.9817	0.1342	7.2085	0.0000
7.3282		7.3282		7.2085		8.1159		7.2085	

P125		P126		P127		P128		P133	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	1.0800	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.9700	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.6960	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3669	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.7100	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0159
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6500	0.0000	0.0000	0.5400	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4667	0.0000	0.6768	0.0000	0.0000	0.1153	1.2204	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.1127	0.4762	3.2422	0.2428	0.0000	0.0000	1.6088	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.2800	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.3794	0.4762	4.6150	0.2428	7.0569	0.1153	2.8291	0.5400	0.0000	0.0159
4.8556		4.8578		7.1722		3.3691		0.0159	

P134		P135		P136		P137		P138	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1232	0.0000	0.0035	0.0000	0.0104	0.0000	0.0104	0.0000	0.0105
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1232	0.0000	0.0035	0.0000	0.0104	0.0000	0.0104	0.0000	0.0105
0.1232		0.0035		0.0104		0.0104		0.0105	

P139		P140		P146		P147		P148	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.4332	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3112	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0575	0.0000
0.0000	0.0583	0.0000	0.0530	0.0000	0.0000	0.0000	0.0000	0.4523	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0696	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6479	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1979	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.1093	0.0000	0.1093	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8195	0.0000
0.0000	0.0000	0.0000	0.0000	3.1700	0.0000	3.1700	0.0000	0.5263	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0134	0.0000	0.0134	0.0000	1.8015	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5652	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3670	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0583	0.0000	0.0530	3.1834	0.1093	3.1834	0.1093	9.2492	0.0000
0.0583		0.0530		3.2927		3.2927		9.2492	

P149		P150		P151		P152		P153	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.5534	0.0000	1.8000	0.0000	1.8000	0.0000	1.5534	0.0000
0.0000	0.0000	0.3039	0.0000	0.0000	0.0000	0.0000	0.0000	0.3039	0.0000
0.0000	0.0000	0.0487	0.0000	0.0000	0.0000	0.0000	0.0000	0.0487	0.0000
0.0000	0.0000	0.7925	0.0000	0.0000	0.0000	0.0000	0.0000	0.7925	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0721	0.0000	0.0000	0.0000	0.0000	0.0000	0.0721	0.0000
0.0000	0.0000	0.5976	0.0000	0.0000	0.0000	0.0000	0.0000	0.5976	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.7869	0.0000	0.0000	0.0000	0.0000	0.0000	0.7869	0.0000
1.1637	0.0000	1.7625	0.0000	1.7232	0.0000	0.4879	0.0000	1.7625	0.0000
3.0165	0.0000	1.0294	0.0000	2.9121	0.0000	3.1700	0.0000	1.0294	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5168	0.1764	2.7323	0.0000	3.3300	0.0991	3.3300	0.4339	2.7323	0.0000
0.8152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.3122	0.1764	9.6793	0.0000	9.7653	0.0991	9.7879	0.4339	9.6793	0.0000
9.4886		9.6793		9.8644		10.2218		9.6793	

P155		P157		P158		P159		P160	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.3951	0.0000	1.3686	0.0000	1.5311	0.0000	1.5311	0.0000
0.0000	0.0000	0.3115	0.0000	0.3109	0.0000	0.0135	0.0000	0.0135	0.0000
0.0000	0.0000	0.0570	0.0000	0.0315	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4561	0.0000	0.4397	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.9918	0.0000	0.9772	0.0000	0.5740	0.0000	0.5740	0.0000
0.0000	0.0000	0.4872	0.0000	0.1576	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6828	0.0000	1.7370	0.0000	1.6810	0.0000	1.7052	0.0000	1.7052	0.0000
2.9793	0.0000	0.3983	0.0000	0.5483	0.0000	2.0334	0.0000	2.0334	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0854	1.6340	0.0000	1.6450	0.0000	3.3254	0.0000	3.3254	0.0000
0.0000	0.0000	1.0947	0.0000	0.0950	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.7921	0.0854	8.6667	0.0000	7.2549	0.0000	9.1827	0.0000	9.1827	0.0000
8.8775		8.6667		7.2549		9.1827		9.1827	

P161		P162		P163		P164		P165	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1222	0.2500	0.1216	0.2500	0.1046	0.2500	0.1686	0.2500	0.0000	0.0000
0.0000	0.2654	0.0000	0.2787	0.0000	0.2818	0.0000	0.2332	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4997	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1772	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1146	0.3504
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1222	0.5154	0.1216	0.5287	0.1046	0.5318	0.1686	0.4832	6.5915	0.3504
0.6376		0.6503		0.6365		0.6518		6.9419	

P166		P167		P168		P169		P170	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5020	0.0000	0.0000	0.0000	1.4194	0.0000	1.4194	0.0000
0.0000	0.0000	0.5234	0.0000	0.0000	0.0000	0.3649	0.0000	0.3649	0.0000
0.0000	0.0000	0.3278	0.0000	0.0000	0.0000	0.1273	0.0000	0.1273	0.0000
0.0000	0.0000	0.0658	0.0000	0.0000	0.0000	0.4219	0.0000	0.4219	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0814	0.0000	0.0000	0.0000	0.0672	0.0000	0.0672	0.0000
0.0000	0.0000	0.6388	0.0000	0.0000	0.0000	0.4722	0.0000	0.4722	0.0000
0.0000	0.0000	0.1307	0.0000	0.0000	0.0000	0.0364	0.0000	0.0364	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5512	0.5400	0.0000	0.0000	2.5512	0.5400	0.0000	0.0000	0.0000	0.0000
0.0000	0.1946	1.8884	0.0000	0.0000	0.1946	1.7740	0.0000	1.7740	0.0000
0.0000	0.0000	0.4441	0.0000	0.0000	0.0000	0.4264	0.0000	0.4264	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.6642	0.0000	0.0000	0.0000	1.6580	0.0000	1.6580	0.0000
0.0000	0.0000	1.1914	0.0000	0.0000	0.0000	1.1312	0.0000	1.1312	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5512	0.7346	8.4579	0.0000	2.5512	0.7346	7.8989	0.0000	7.8989	0.0000
3.2858		8.4579		3.2858		7.8989		7.8989	

P171		P172		P173		P174		P175	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.6778	0.0000	1.5674	0.0000	1.8000	0.0000	1.4194	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3649	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1273	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4219	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3680	0.0000	0.0000	0.0000	0.0672	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4722	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0364	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.8252	0.0000	0.0000	0.0000	0.8705	0.0000	0.7163	0.0000	1.7740	0.0000
2.0266	0.0000	1.6509	0.5486	1.4293	0.0000	3.1700	0.0000	0.4264	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.1339	2.7627	0.6800	3.1766	0.0000	3.3076	0.3957	1.6580	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1312	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.9818	0.1339	6.0914	1.2286	7.4119	0.0000	8.9939	0.3957	7.8989	0.0000
8.1157		7.3200		7.4119		9.3896		7.8989	

P176		P177		P178		P179		P182	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4194	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.5674	0.0000
0.3649	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1273	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4219	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0672	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3680	0.0000
0.4722	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.6766	0.0000	0.0000	0.0000
1.7740	0.0000	0.8252	0.0000	0.7319	0.0000	0.0000	0.0000	0.8705	0.0000
0.4264	0.0000	2.0266	0.0000	2.9410	0.0000	3.1700	0.0000	1.4293	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6580	0.0000	3.3300	0.1339	2.4963	0.2216	3.3300	0.4419	3.1766	0.0000
1.1312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.8989	0.0000	7.9818	0.1339	7.9692	0.2216	9.9766	0.4419	7.4119	0.0000
7.8989		8.1157		8.1908		10.4185		7.4119	

P183		P184		P185		P186		P187	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	0.6397	0.0000	1.7049	0.0000	1.7049	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2627	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4961	0.0000	0.0000	0.0000	0.4944	0.0000	0.4944	0.0000
3.1700	0.0000	2.1806	0.0000	2.1971	0.1656	1.6788	0.0000	1.6788	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.4614	2.1140	0.3486	3.2883	0.6800	3.3300	0.0000	3.3300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.5627	0.4614	6.5908	0.3486	6.1252	0.8456	7.2081	0.0000	7.2081	0.0000
9.0241		6.9394		6.9707		7.2081		7.2081	

P188		P189		P191		P192		P193	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.4228	0.0000	1.8000	0.0000	1.7261	0.0000	0.0000	0.0000
0.0000	0.0000	0.3575	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1374	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4188	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0672	0.0000	0.0000	0.0000	0.0000	0.0000	0.0568	0.0000
0.0000	0.0000	0.4721	0.0000	0.0000	0.0000	0.0000	0.0000	1.7500	0.0000
0.0000	0.0000	0.0332	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.1398
1.0685	0.0000	1.7736	0.0000	0.8246	0.0000	0.0000	0.0000	0.0000	0.0000
1.3287	0.0000	0.4269	0.0000	2.0271	0.0000	2.9476	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.3889	0.1742	1.6583	0.0000	3.3300	0.1342	3.3300	0.4507	0.0000	0.0000
0.0000	0.0000	1.1312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.5861	0.1742	7.8990	0.0000	7.9817	0.1342	8.0037	0.4507	4.4568	0.1398
6.7603		7.8990		8.1159		8.4544		4.5967	

P194		P195		P196		P197		P198	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.8000	0.0000	1.4005	0.0000	1.5663	0.0000
0.2272	0.0000	0.2361	0.0000	0.0000	0.0000	0.3579	0.0000	0.4040	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1317	0.0000	0.1890	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4062	0.0000	0.6590	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2557	0.0000	0.2637	0.0000	0.0000	0.0000	0.9878	0.0000	0.0646	0.0000
1.7500	0.0000	1.7500	0.0000	0.0000	0.0000	0.3170	0.0000	0.4031	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.1911	2.6500	0.1921	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.4739	0.0000	1.7007	0.0000	1.6730	0.0000
0.0000	0.0000	0.0000	0.0000	2.3726	0.0000	0.3719	0.0000	0.7119	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.3300	0.0873	1.5892	0.0000	2.4325	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0654	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.8828	0.1911	4.8999	0.1921	8.9765	0.0873	7.3282	0.0000	8.1034	0.0000
5.0739		5.0920		9.0639		7.3282		8.1034	

P199		P202		P203		P204		P205	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.6804	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9517	0.0000	0.0000	0.0000	0.5754	0.0000	0.6667	0.0000	1.8562	0.0000
2.0994	0.0000	1.6489	0.5492	1.3607	0.0000	3.1700	0.0000	2.9784	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.1276	2.7620	0.6800	2.4134	0.2460	3.3300	0.5637	3.3300	0.0925
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.1811	0.1276	6.0913	1.2292	6.1495	0.2460	9.9667	0.5637	9.9645	0.0925
8.3086		7.3205		6.3954		10.5304		10.0570	

P206		P207		P208		P209		P210	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4005	0.0000	1.4005	0.0000	1.4275	0.0000	0.0000	0.0000	0.4548	0.0000
0.3579	0.0000	0.3579	0.0000	0.4131	0.0000	0.0000	0.0000	0.0000	0.0000
0.1317	0.0000	0.1317	0.0000	0.2073	0.0000	0.0000	0.0000	0.0000	0.0000
0.4062	0.0000	0.4062	0.0000	0.3203	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1245	0.2500	0.0000	0.0000
0.9878	0.0000	0.9878	0.0000	0.0624	0.0000	0.0000	0.2702	0.0000	0.0000
0.3170	0.0000	0.3170	0.0000	0.4193	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.1109	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6168	0.0000
1.7007	0.0000	1.7007	0.0000	1.7206	0.0000	0.0000	0.0000	0.0000	0.0000
0.3719	0.0000	0.3719	0.0000	0.4444	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5892	0.0000	1.5892	0.0000	1.8431	0.0000	0.0000	0.0000	1.7802	0.3497
0.0654	0.0000	0.0654	0.0000	0.0731	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.3282	0.0000	7.3282	0.0000	7.0418	0.0000	0.1245	0.5202	2.8518	0.3497
7.3282		7.3282		7.0418		0.6447		3.2016	

P212		P213		P214		P215		P220	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0305	0.0000	1.2942	0.0000	0.0000	0.0000	1.3445	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2744	0.0000	0.0000	0.0000
0.0000	0.0000	0.0701	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.8492	0.0000	0.0000	0.0000	0.2430	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1366
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4598	0.0000	0.0000	0.0000
0.0000	0.0000	0.0593	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.1165	0.0000	1.8536	0.0000	0.0000	0.0000	0.0000	0.3229
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3103	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6814	0.0000	2.8845	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8010	0.1376	2.0774	0.0000	0.0000	0.0000	1.8742	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.2800	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.8315	0.1376	6.4667	0.0000	3.1336	0.0000	6.1876	0.0000	2.8845	0.4595
2.9691		6.4667		3.1336		6.1876		3.3440	

P221		P225		P227		P228		P229	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.6645	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.2603	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.0726	0.0000	0.7297	0.0000	0.7458	0.0000	0.0000	0.1427
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7430	0.0000	0.0434	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7430	0.0000	2.1653	0.0000	0.7297	0.0000	0.7458	0.0000	0.0000	0.1427
0.7430		2.1653		0.7297		0.7458		0.1427	

P230		P231		P232		P233		P234	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0157	0.0000	0.0158	0.0000	0.0157	0.0000	0.0098
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0157	0.0000	0.0158	0.0000	0.0157	0.0000	0.0098
0.0089		0.0157		0.0158		0.0157		0.0098	

P235		P236		P237		P238		P239	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0156	0.0000	0.0158	0.0000	0.0642	0.0000	0.0105	0.0000	0.0583
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0156	0.0000	0.0158	0.0000	0.0642	0.0000	0.0105	0.0000	0.0583
0.0156		0.0158		0.0642		0.0105		0.0583	

P240		P241		P242		P246		P248	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6755	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1753	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9348	0.0000	0.0875	0.0000	0.0000	0.0585	0.0000	0.1090	0.0441	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0854	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8349	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9348	0.0000	0.0875	0.0000	0.0000	0.0585	0.0000	0.1090	2.2452	0.0000
0.9348		0.0875		0.0585		0.1090		2.2452	

P249		P250		P259		P260		P264	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3557	0.0000	0.3557	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1667	0.0000	0.1667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0660	0.0000	0.0660	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0645	0.0000	0.0645	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1077	0.0000	0.1077	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.3464	0.0000	0.3464	0.0000	0.3464
0.0263	0.0000	0.0263	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6452	0.0000	2.6452	0.0000	2.6452	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7869	0.0000	0.7869	0.0000	2.6452	0.3464	2.6452	0.3464	2.6452	0.3464
0.7869		0.7869		2.9916		2.9916		2.9916	

P265		P266		P267		P268		P269	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4015	0.0000	1.4015	0.0000	1.5034	0.0000	1.8000	0.0000	1.8000	0.0000
0.3170	0.0000	0.3170	0.0000	0.1807	0.0000	0.0000	0.0000	0.0000	0.0000
0.0587	0.0000	0.0587	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2609	0.0000	0.2609	0.0000	0.4542	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0627	0.0000	0.0627	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6409	0.0000	0.6409	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3703	0.0000	0.3703	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7229	0.0000	1.7229	0.0000	0.9815	0.0000	0.7527	0.0000	0.8440	0.0000
0.4287	0.0000	0.4287	0.0000	0.7769	0.0000	1.5417	0.0000	2.2924	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7128	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8491	0.0000	1.8491	0.0000	3.2728	0.0000	2.5638	0.0850	3.3300	0.0303
1.0715	0.0000	1.0715	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.1843	0.0000	8.1843	0.0000	7.1696	0.0000	7.3711	0.0850	8.2664	0.0303
8.1843		8.1843		7.1696		7.4561		8.2967	

P270		P271		P272		P273		P274	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.5833	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8065	0.0000
0.4529	0.0000	0.4529	0.0000	0.4529	0.0000	1.1637	0.0000	0.0000	0.0000
1.3361	0.0000	1.3361	0.0000	1.3361	0.0000	3.0165	0.0000	2.5658	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.7299	0.0883	2.7299	0.0883	2.7299	0.0883	2.5168	0.1764	3.3300	0.3659
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8152	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.3189	0.0883	6.3189	0.0883	6.3189	0.0883	9.3122	0.1764	8.2856	0.3659
6.4072		6.4072		6.4072		9.4886		8.6515	

P275		P276		P277		P278		P279	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7744	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.5580	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.2411	0.0000	0.4250	0.0000	0.7036	0.0000	0.0000	0.0000
2.2543	0.0279	3.1700	0.0378	2.7456	0.2199	2.0703	0.0000	3.0347	0.0000
0.0000	0.0000	0.2569	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.6800	2.8472	0.6800	2.4111	0.6800	3.3289	0.1808	3.3300	0.5053
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.3586	0.7079	9.3151	0.7178	7.3818	0.8999	7.9028	0.1808	7.9227	0.5053
7.0665		10.0330		8.2817		8.0836		8.4281	

P280		P281		P282		P283		P284	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6052	0.0000	1.5388	0.0000	1.5388	0.0000	1.5580	0.0000	1.5388	0.0000
0.0000	0.0000	0.3043	0.0000	0.3043	0.0000	0.0000	0.0000	0.3043	0.0000
0.0000	0.0000	0.0140	0.0000	0.0140	0.0000	0.0000	0.0000	0.0140	0.0000
0.0000	0.0000	0.7117	0.0000	0.7117	0.0000	0.0000	0.0000	0.7117	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0512	0.0000	0.0512	0.0000	0.0000	0.0000	0.0512	0.0000
0.0000	0.0000	0.1731	0.0000	0.1731	0.0000	0.0000	0.0000	0.1731	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2997	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5679	0.0000	1.5679	0.0000	0.0000	0.0000	1.5679	0.0000
3.1700	0.0000	0.8926	0.0000	0.8926	0.0000	3.0347	0.0000	0.8926	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.4014	2.5838	0.0000	2.5838	0.0000	3.3300	0.5053	2.5838	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.4049	0.4014	7.8373	0.0000	7.8373	0.0000	7.9227	0.5053	7.8373	0.0000
8.8063		7.8373		7.8373		8.4281		7.8373	

P285		P286		P287		P288		P289	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.6040	0.0000	1.3753	0.0000	1.5580	0.0000	1.6040	0.0000
0.0000	0.0000	0.0000	0.0000	0.3170	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0598	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2790	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0613	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4034	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0815	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7036	0.0000	0.0000	0.0000	1.7088	0.0000	0.0000	0.0000	0.0000	0.0000
2.0703	0.0000	1.6751	0.6285	0.5702	0.0000	3.0347	0.0000	1.6751	0.6285
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3289	0.1808	2.7340	0.6800	1.8522	0.0000	3.3300	0.5053	2.7340	0.6800
0.0000	0.0000	0.0000	0.0000	0.0635	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.9028	0.1808	6.0131	1.3085	6.7720	0.0000	7.9227	0.5053	6.0131	1.3085
8.0836		7.3216		6.7720		8.4281		7.3216	

P290		P291		P292		P293		P294	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5580	0.0000	1.5234	0.0000	1.5534	0.0000	1.8000	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3039	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0487	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.7925	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0721	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.5976	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.7869	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.7625	0.0000	0.4879	0.0000	0.0000	0.0000
3.0347	0.0000	2.4394	0.5225	1.0294	0.0000	3.1700	0.0000	2.8801	0.4545
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.5053	1.4562	0.0000	2.7323	0.0000	3.3300	0.4339	3.1858	0.6800
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.9227	0.5053	5.4190	0.5225	9.6793	0.0000	9.7879	0.4339	7.8659	1.1345
8.4281		5.9415		9.6793		10.2218		9.0004	

P295		P296		P297		P298		P299	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5534	0.0000	1.8000	0.0000	1.6509	0.0000	1.5534	0.0000	1.8000	0.0000
0.3039	0.0000	0.3163	0.0000	0.3240	0.0000	0.3039	0.0000	0.0000	0.0000
0.0487	0.0000	0.0000	0.0000	0.0497	0.0000	0.0487	0.0000	0.0000	0.0000
0.7925	0.0000	0.0000	0.0000	0.0000	0.0000	0.7925	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0721	0.0000	0.0000	0.0000	0.0969	0.0000	0.0721	0.0000	0.0000	0.0000
0.5976	0.0000	0.1066	0.0000	1.7500	0.0000	0.5976	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.0563	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7869	0.0000	0.0000	0.0000	0.0873	0.0000	0.7869	0.0000	0.0000	0.0000
1.7625	0.0000	1.9400	0.0000	1.9400	0.0000	1.7625	0.0000	1.7232	0.0000
1.0294	0.0000	3.1305	0.0000	0.8906	0.0000	1.0294	0.0000	2.9121	0.0000
0.0000	0.0000	0.0000	0.0000	0.7600	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.7323	0.0000	2.4731	0.0659	2.0133	0.0000	2.7323	0.0000	3.3300	0.0991
0.0000	0.0000	1.5061	0.0000	1.0337	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.6793	0.0000	11.2726	0.0659	11.6528	0.0000	9.6793	0.0000	9.7653	0.0991
9.6793		11.3385		11.6528		9.6793		9.8644	

P300		P301		P303		P304		P305	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	0.8101	0.0000	0.5443	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.5772	0.0000	0.6509	0.0000	0.2019	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4470	0.0000	0.5960	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.7500	0.0000	1.7500	0.0000	1.5083	0.0000
0.0000	0.0000	0.0000	0.0000	1.8600	0.0000	0.0000	0.0000	0.7888	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6500	0.0369	2.6500	0.0318	2.6500	0.4730
0.4879	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1700	0.0000	2.8801	0.4545	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.4339	3.1858	0.6800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.7879	0.4339	7.8659	1.1345	8.0942	0.0369	6.1912	0.0318	5.1491	0.4730
10.2218		9.0004		8.1312		6.2230		5.6221	

P306		P307		P308		P309		P311	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.5960	0.0000	0.0000	0.0000	0.7422	0.0000	0.0000	0.0000
0.0000	0.0000	0.5509	0.0000	0.1335	0.0000	0.5573	0.0000	0.1874	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0624	0.0000	0.5138	0.0000	0.0000	0.0000	0.5180	0.0000	0.0795	0.0000
1.7500	0.3600	1.7500	0.0000	1.0756	0.0000	1.7500	0.0000	1.7500	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1515	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.5400	2.6500	0.1478	2.6500	0.3243	2.6500	0.1171	2.6500	0.3262
0.0000	0.0000	0.1710	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1700	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10.9624	0.9000	6.2317	0.1478	3.8591	0.3243	6.2175	0.1171	4.8184	0.3262
11.8624		6.3795		4.1834		6.3346		5.1446	

P312		P313		P314		P315		P316	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3951	0.0000	1.4461	0.0000	1.8000	0.0000	1.8000	0.0000	1.3686	0.0000
0.3115	0.0000	0.3124	0.0000	0.0000	0.0000	0.0000	0.0000	0.3109	0.0000
0.0570	0.0000	0.0561	0.0000	0.0000	0.0000	0.0000	0.0000	0.0315	0.0000
0.4561	0.0000	0.4143	0.0000	0.0000	0.0000	0.0000	0.0000	0.4397	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9918	0.0000	0.9912	0.0000	0.1852	0.0000	0.2152	0.0000	0.9772	0.0000
0.4872	0.0000	0.7061	0.0000	0.0000	0.0000	0.0000	0.0000	0.1576	0.0000
0.1041	0.0000	0.4213	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7370	0.0000	1.8026	0.0000	1.1564	0.0000	1.4990	0.0000	1.6810	0.0000
0.3983	0.0000	0.7089	0.0000	1.2922	0.0000	3.0090	0.0000	0.5483	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6340	0.0000	2.2133	0.0000	2.3822	0.1656	2.7074	0.0729	1.6450	0.0000
1.0947	0.0000	0.0787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0950	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.6667	0.0000	9.1510	0.0000	6.8159	0.1656	9.2306	0.0729	7.2549	0.0000
8.6667		9.1510		6.9815		9.3034		7.2549	

P317		P318		P319		P320		P321	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5311	0.0000	1.8000	0.0000	1.4629	0.0000	1.5565	0.0000	1.8000	0.0000
0.0135	0.0000	0.3349	0.0000	0.3193	0.0000	0.3048	0.0000	0.1606	0.0000
0.0000	0.0000	0.0273	0.0000	0.0586	0.0000	0.0343	0.0000	0.0000	0.0000
0.0000	0.0000	0.1600	0.0000	0.1555	0.0000	0.7007	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5740	0.0000	0.9606	0.0000	0.9933	0.0000	0.9794	0.0000	0.5958	0.0000
0.0000	0.0000	0.2707	0.0000	1.1148	0.0000	0.5396	0.0000	0.0119	0.0000
0.0000	0.0000	0.0000	0.0000	0.9708	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9190	0.0000	0.0000	0.0000
1.7052	0.0000	1.9400	0.0000	1.8330	0.0000	1.8108	0.0000	1.5407	0.0000
2.0334	0.0000	1.2571	0.0000	0.3933	0.0000	1.0611	0.0000	2.6131	0.0000
0.0000	0.0000	0.8567	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3254	0.0000	2.2915	0.0000	1.8533	0.0000	2.7356	0.0000	2.5222	0.1071
0.0000	0.0000	0.7650	0.0000	0.4061	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.1827	0.0000	10.6638	0.0000	9.5607	0.0000	10.6420	0.0000	9.2442	0.1071
9.1827		10.6638		9.5607		10.6420		9.3513	

P322		P323		P324		P325		P326	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.3951	0.0000	1.3631	0.0000	1.3731	0.0000	1.4461	0.0000
0.2282	0.0000	0.3115	0.0000	0.3136	0.0000	0.3143	0.0000	0.3124	0.0000
0.0000	0.0000	0.0570	0.0000	0.0441	0.0000	0.0576	0.0000	0.0561	0.0000
0.0000	0.0000	0.4561	0.0000	0.3725	0.0000	0.3740	0.0000	0.4143	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1359	0.0000	0.9918	0.0000	0.9818	0.0000	0.9882	0.0000	0.9912	0.0000
1.7500	0.0000	0.4872	0.0000	0.2186	0.0000	0.4030	0.0000	0.7061	0.0000
0.0216	0.0000	0.1041	0.0000	0.0000	0.0000	0.1167	0.0000	0.4213	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.3249	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.7370	0.0000	1.6238	0.0000	1.6872	0.0000	1.8026	0.0000
0.0000	0.0000	0.3983	0.0000	0.2800	0.0000	0.4269	0.0000	0.7089	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.6340	0.0000	1.5418	0.0000	1.8282	0.0000	2.2133	0.0000
0.0000	0.0000	1.0947	0.0000	0.0000	0.0000	0.0455	0.0000	0.0787	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.7857	0.3249	8.6667	0.0000	6.7394	0.0000	7.6145	0.0000	9.1510	0.0000
6.1106		8.6667		6.7394		7.6145		9.1510	

P327		P328		P329		P330		P331	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5148	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4045	0.0000	0.0000	0.0000	0.1852	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7156	0.0000	0.6828	0.0000	1.1564	0.0000	0.0000	0.0000	0.0000	0.0000
1.3293	0.0000	2.9793	0.0000	1.2922	0.0000	0.8162	0.0000	1.7617	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	3.3300	0.0854	2.3822	0.1656	3.2080	0.3271	2.2474	0.3788
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.2942	0.0000	8.7921	0.0854	6.8159	0.1656	5.8242	0.3271	5.8091	0.3788
7.2942		8.8775		6.9815		6.1513		6.1879	

P332		P333		P334		P335		P336	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3686	0.0000	1.5311	0.0000	1.4629	0.0000	1.5311	0.0000	0.0000	0.0000
0.3109	0.0000	0.0135	0.0000	0.3193	0.0000	0.0135	0.0000	0.3981	0.0000
0.0315	0.0000	0.0000	0.0000	0.0586	0.0000	0.0000	0.0000	0.0000	0.0000
0.4397	0.0000	0.0000	0.0000	0.1555	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9772	0.0000	0.5740	0.0000	0.9933	0.0000	0.5740	0.0000	1.2032	0.0000
0.1576	0.0000	0.0000	0.0000	1.1148	0.0000	0.0000	0.0000	1.7500	0.0000
0.0000	0.0000	0.0000	0.0000	0.9708	0.0000	0.0000	0.0000	1.1374	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.3432
1.6810	0.0000	1.7052	0.0000	1.8330	0.0000	1.7052	0.0000	0.0000	0.0000
0.5483	0.0000	2.0334	0.0000	0.3933	0.0000	2.0334	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6450	0.0000	3.3254	0.0000	1.8533	0.0000	3.3254	0.0000	0.0000	0.0000
0.0950	0.0000	0.0000	0.0000	0.4061	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.2549	0.0000	9.1827	0.0000	9.5607	0.0000	9.1827	0.0000	7.1387	0.3432
7.2549		9.1827		9.5607		9.1827		7.4819	

P337		P338		P339		P340		P341	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5331	0.0000	1.2925	0.0000	1.8000	0.0000	1.3951	0.0000
0.0000	0.0000	0.0000	0.0000	0.2814	0.0000	0.0000	0.0000	0.3115	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0570	0.0000
0.0000	0.0000	0.0000	0.0000	0.3082	0.0000	0.0000	0.0000	0.4561	0.0000
0.0000	0.0000	0.2503	0.0000	0.2502	0.0000	0.0000	0.0000	0.0000	0.0000
0.2227	0.0000	0.9766	0.0000	1.6646	0.0000	0.0000	0.0000	0.9918	0.0000
1.0995	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4872	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1041	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.0319	0.5400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.7408	0.0000	1.1724	0.0000	0.0000	0.0000	1.7370	0.0000
0.0000	0.0000	1.4889	0.0000	0.0000	0.0000	1.8244	0.0276	0.3983	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.2213	0.0000	1.2485	0.0000	2.8088	0.6800	1.6340	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0947	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3542	0.5400	8.2110	0.0000	6.2178	0.0000	6.4333	0.7076	8.6667	0.0000
3.8942		8.2110		6.2178		7.1409		8.6667	

P342		P343		P344		P345		P346	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3951	0.0000	1.4461	0.0000	1.8000	0.0000	1.5388	0.0000	1.8000	0.0000
0.3115	0.0000	0.3124	0.0000	0.0000	0.0000	0.3042	0.0000	0.0000	0.0000
0.0570	0.0000	0.0561	0.0000	0.0000	0.0000	0.0103	0.0000	0.0000	0.0000
0.4561	0.0000	0.4143	0.0000	0.0000	0.0000	0.6932	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9918	0.0000	0.9912	0.0000	0.0000	0.0000	0.9683	0.0000	0.0000	0.0000
0.4872	0.0000	0.7061	0.0000	0.0000	0.0000	0.1727	0.0000	0.0000	0.0000
0.1041	0.0000	0.4213	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7370	0.0000	1.8026	0.0000	0.0000	0.0000	1.6067	0.0000	0.0000	0.0000
0.3983	0.0000	0.7089	0.0000	2.1678	0.4531	0.9194	0.0000	0.8868	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6340	0.0000	2.2133	0.0000	2.9174	0.6800	2.5861	0.0000	2.8903	0.5262
1.0947	0.0000	0.0787	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.6667	0.0000	9.1510	0.0000	6.8853	1.1331	8.7997	0.0000	5.5771	0.5262
8.6667		9.1510		8.0184		8.7997		6.1033	

P347		P348		P349		P350		P351	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4629	0.0000	1.3157	0.0000	0.0000	0.0000	0.0000	0.0000	1.2925	0.0000
0.3193	0.0000	0.0000	0.0000	0.1570	0.0000	0.2274	0.0000	0.2814	0.0000
0.0586	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1555	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3082	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2502	0.0000
0.9933	0.0000	0.0000	0.0000	1.1138	0.0000	1.0974	0.0000	1.6646	0.0000
1.1148	0.0000	0.0000	0.0000	1.7500	0.0000	1.7500	0.0000	0.0000	0.0000
0.9708	0.0000	0.0000	0.0000	0.0000	0.0000	0.0453	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6500	0.2937	2.6500	0.4039	0.0000	0.0000
1.8330	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1724	0.0000
0.3933	0.0000	3.1700	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8533	0.0000	3.3300	0.6283	0.0000	0.0000	0.0000	0.0000	1.2485	0.0000
0.4061	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.5607	0.0000	7.8157	0.6283	5.6708	0.2937	5.7701	0.4039	6.2178	0.0000
9.5607		8.4440		5.9645		6.1740		6.2178	

P352		P353		P354		P355		P356	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7183	0.0000	1.4699	0.0000	1.4628	0.0000	1.5331	0.0000	1.3729	0.0000
0.2059	0.0000	0.3222	0.0000	0.3191	0.0000	0.0000	0.0000	0.3137	0.0000
0.0000	0.0000	0.0612	0.0000	0.0584	0.0000	0.0000	0.0000	0.0572	0.0000
0.0000	0.0000	0.0618	0.0000	0.1602	0.0000	0.0000	0.0000	0.3949	0.0000
0.2490	0.0000	0.2593	0.0000	0.2587	0.0000	0.2503	0.0000	0.2561	0.0000
1.5577	0.0000	1.7100	0.0000	1.7100	0.0000	0.9766	0.0000	1.7100	0.0000
1.1240	0.0000	1.1339	0.0000	1.1188	0.0000	0.0000	0.0000	0.4021	0.0000
0.0000	0.0000	0.9577	0.0000	0.9708	0.0000	0.0000	0.0000	0.1199	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.3463	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.8428	0.0000	1.8352	0.0000	0.7408	0.0000	1.6838	0.0000
0.0000	0.0000	0.2943	0.0000	0.3950	0.0000	1.4889	0.0000	0.4257	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5716	0.0000	1.8551	0.0000	3.2213	0.0000	1.8271	0.0000
1.8100	0.0000	0.3860	0.0000	0.4079	0.0000	0.0000	0.0000	0.0426	0.0000
1.2800	0.1325	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10.2913	0.1325	10.0707	0.0000	10.5521	0.0000	8.2110	0.0000	8.6060	0.0000
10.4238		10.0707		10.5521		8.2110		8.6060	

P357		P358		P359		P360		P361	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3062	0.0000	0.2759	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0236	0.0000	0.0315	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2859	0.0000	0.3140	0.0000
0.2508	0.0000	0.1047	0.2500	0.1192	0.2500	1.2500	0.0000	1.2500	0.0000
0.1451	0.0000	0.0000	0.2813	0.0000	0.2782	1.4354	0.0000	1.4443	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1604	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.0229	0.3854	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.3792	0.3854	0.1047	0.5313	0.1192	0.5282	3.3012	0.0000	3.3159	0.0000
6.7646		0.6360		0.6474		3.3012		3.3159	

P362		P363		P364		P365		P366	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1378	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1046	0.2500	0.1231	0.2500	1.2500	0.0000	1.2389	0.0000	0.2648	0.2500
0.0000	0.2818	0.0000	0.2673	0.2638	0.0000	0.6876	0.0000	0.0000	0.1413
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7830	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2800	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1046	0.5318	0.1231	0.5173	1.5138	0.0000	6.7773	0.0000	0.2648	0.3913
0.6365		0.6404		1.5138		6.7773		0.6561	

P367		P368		P369		P370		P371	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5020	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000
0.0000	0.0000	0.5234	0.0000	0.0000	0.0000	0.0000	0.0000	0.0596	0.0000
0.0000	0.0000	0.3278	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0658	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2648	0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1413	0.0814	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.6388	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1307	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2637	0.0000	0.0000	0.0000
0.0000	0.0000	1.8884	0.0000	0.0000	0.0000	0.0000	0.0000	1.7271	0.0000
0.0000	0.0000	0.4441	0.0000	0.6456	0.0000	3.1700	0.0000	3.1700	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.6642	0.0000	3.1467	0.3559	3.3300	0.4603	3.3300	0.1816
0.0000	0.0000	1.1914	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2648	0.3913	8.4579	0.0000	5.5923	0.3559	8.5637	0.4603	10.0867	0.1816
0.6561		8.4579		5.9482		9.0239		10.2683	

P372		P373		P374		P375		P376	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5776	0.0000	1.6541	0.0000	0.0000	0.0000	0.6503	0.0000	1.4088	0.0000
0.5147	0.0000	0.3368	0.0000	0.6937	0.0209	0.0000	0.0000	0.4949	0.0000
0.2999	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2523	0.0000
0.0000	0.0000	0.0520	0.0000	0.0000	0.0000	0.0000	0.0000	0.1368	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0972	0.0000	0.0000	0.0000	0.4373	0.0000	0.0000	0.0000	0.9490	0.0000
1.3396	0.0000	0.0000	0.0000	1.7500	0.3600	0.0000	0.0000	0.0000	0.0000
0.5110	0.0000	0.0000	0.0000	1.9500	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.2695	0.0000	2.6500	0.5400	0.0000	0.0000	0.0000	0.0000
1.9400	0.0000	1.9400	0.0000	0.0000	0.0000	0.0000	0.0000	1.4192	0.0000
0.4002	0.0000	2.3617	0.0000	3.1700	0.0000	2.1904	0.1641	0.0829	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6595	0.0000	3.3300	0.0000	3.3300	0.0000	3.2848	0.6800	1.7133	0.0000
0.5346	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.8742	0.0000	10.9442	0.0000	13.9809	0.9209	6.1254	0.8441	6.4573	0.0000
8.8742		10.9442		14.9018		6.9695		6.4573	

P377		P378		P379		P380		P381	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6366	0.0000	1.6366	0.0000	0.0000	0.0000	1.6508	0.0000	1.8000	0.0000
0.2115	0.0000	0.2115	0.0000	0.2123	0.0000	0.0011	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5353	0.0000	0.5353	0.0000	1.1552	0.0000	0.3225	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.7500	0.3600	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6500	0.5400	0.0000	0.0000	0.0000	0.0000
1.9396	0.0000	1.9396	0.0000	0.0000	0.0000	1.1090	0.0000	0.0000	0.0000
2.2876	0.0000	2.2876	0.0000	2.3040	0.0000	1.6489	0.0000	1.2641	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	3.3300	0.0000	3.3300	0.0000	3.2426	0.0000	3.0412	0.4002
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.9407	0.0000	9.9407	0.0000	11.4015	0.9000	7.9748	0.0000	6.1053	0.4002
9.9407		9.9407		12.3015		7.9748		6.5056	

P382		P383		P384		P385		P386	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.6477	0.0000	0.0000	0.0000	1.5020	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5234	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3278	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0658	0.0000	0.0000	0.0000
0.0000	0.0000	0.2502	0.0000	1.2500	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.0077	0.0000	1.0325	0.0000	0.0814	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6388	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1307	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1528	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1017	0.0000	1.1115	0.0000	0.0000	0.0000	1.8884	0.0000	1.6319	0.0000
3.1700	0.0000	1.6906	0.0000	0.0000	0.0000	0.4441	0.0000	1.6682	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8979	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.3815	3.2602	0.0000	0.0000	0.0000	1.6642	0.0000	2.5240	0.0392
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1914	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.5545	0.3815	8.9680	0.0000	2.2825	0.0000	8.4579	0.0000	8.5219	0.0392
9.9359		8.9680		2.2825		8.4579		8.5612	

P387		P388		P389		P390		P391	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.2365	0.0000	1.4735	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5224	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3068	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0528	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0684	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3326	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2637	0.0000	1.4296	0.0000	0.0000	0.0000
1.0721	0.0000	1.0721	0.0000	0.0000	0.0000	0.0000	0.0000	1.8468	0.0000
1.3253	0.0000	1.3253	0.0000	3.1700	0.0000	0.2274	0.1402	0.5868	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.3894	0.1760	2.3894	0.1760	3.3300	0.4603	2.7351	0.6800	1.6659	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1890	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.5868	0.1760	6.5868	0.1760	8.5637	0.4603	5.6286	0.8202	7.0450	0.0000
6.7628		6.7628		9.0239		6.4488		7.0450	

P392		P393		P394		P395		P396	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	1.6508	0.0000	0.6503	0.0000	1.6508	0.0000
0.3468	0.0000	0.2947	0.0000	0.0011	0.0000	0.0000	0.0000	0.0011	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3154	0.0000	0.3225	0.0000	0.0000	0.0000	0.3225	0.0000
0.1675	0.0000	1.7500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.6500	0.1874	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9400	0.0000	0.0000	0.0000	1.1090	0.0000	0.0000	0.0000	1.1090	0.0000
1.6368	0.0000	0.0000	0.0000	1.6489	0.0000	2.1904	0.1641	1.6489	0.0000
0.1719	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.4748	0.0665	0.0000	0.0000	3.2426	0.0000	3.2848	0.6800	3.2426	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.5378	0.0665	5.0100	0.1874	7.9748	0.0000	6.1254	0.8441	7.9748	0.0000
8.6043		5.1975		7.9748		6.9695		7.9748	

P397		P398		P399		P400		P401	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6503	0.0000	1.8000	0.0000	0.0000	0.0000	1.7764	0.0000	1.3989	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0055	0.0000	0.3685	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1279	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3035	0.0000
0.0000	0.0000	0.0000	0.0000	0.1309	0.2500	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.2747	0.0000	0.0000	0.0616	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4173	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1129	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8512	0.0000	1.7122	0.0000
2.1904	0.1641	1.2641	0.0000	0.0000	0.0000	1.8187	0.0000	0.4385	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.2848	0.6800	3.0412	0.4002	0.0000	0.0000	3.3300	0.0000	1.8383	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0663	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.1254	0.8441	6.1053	0.4002	0.1309	0.5247	7.7818	0.0000	6.8460	0.0000
6.9695		6.5056		0.6556		7.7818		6.8460	

P402		P403		P404		P405		P406	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3989	0.0000	1.8000	0.0000	1.3652	0.0000	1.4201	0.0000	1.8000	0.0000
0.3685	0.0000	0.0000	0.0000	0.0000	0.0000	0.3627	0.0000	0.0000	0.0000
0.1279	0.0000	0.0000	0.0000	0.0000	0.0000	0.1121	0.0000	0.0000	0.0000
0.3035	0.0000	0.0000	0.0000	0.0000	0.0000	0.4696	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0616	0.0000	0.0000	0.0000	0.0000	0.0000	0.0611	0.0000	0.0000	0.0000
0.4173	0.0000	0.0000	0.0000	0.0000	0.0000	0.3443	0.0000	0.0000	0.0000
0.1129	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.3459	0.0000	0.0000	0.0000	1.6766	0.0000
1.7122	0.0000	0.7319	0.0000	0.0000	0.0000	1.7821	0.0000	0.0000	0.0000
0.4385	0.0000	2.9410	0.0000	0.8907	0.0000	0.6008	0.0000	3.1700	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8383	0.0000	2.4963	0.2216	2.9710	0.6500	1.7081	0.0000	3.3300	0.4419
0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	1.1602	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.8460	0.0000	7.9692	0.2216	6.5728	0.6500	8.0212	0.0000	9.9766	0.4419
6.8460		8.1908		7.2228		8.0212		10.4185	

P407		P408		P409		P410		P411	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5261	0.0000	1.8000	0.0000	1.5797	0.0000	0.0000	0.0000	1.8000	0.0000
0.3741	0.0000	0.0000	0.0000	0.3710	0.0000	0.0000	0.0000	0.0000	0.0000
0.1303	0.0000	0.0000	0.0000	0.1146	0.0000	0.0000	0.0000	0.0000	0.0000
0.0539	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0730	0.0000	0.0000	0.0000	0.0801	0.0000	0.0561	0.0000	0.0000	0.0000
1.3205	0.0000	0.0000	0.0000	1.7500	0.0000	1.7500	0.0000	0.0000	0.0000
1.1587	0.0000	0.0000	0.0000	1.5392	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.0850	0.0000	2.6500	0.1314	0.0000	0.0000
1.8607	0.0000	1.8569	0.0000	1.9101	0.0000	0.0000	0.0000	1.4746	0.0000
0.3228	0.0000	2.9778	0.0000	0.2595	0.0000	0.0000	0.0000	2.3721	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6220	0.0000	3.3300	0.0920	1.5943	0.0000	0.0000	0.0000	3.3300	0.0869
1.4070	0.0000	0.0000	0.0000	1.5262	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0070	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.8490	0.0000	9.9647	0.0920	11.8169	0.0000	4.4561	0.1314	8.9767	0.0869
9.8490		10.0567		11.8169		4.5875		9.0636	

P412		P413		P414		P415		P416	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.5593	0.0000	1.8000	0.0000	1.0271	0.0000	1.0545	0.0000
0.0000	0.0000	0.1020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2534	0.0000	0.0000	0.0000	0.2508	0.0000	1.2500	0.0000	1.2500	0.0000
1.1860	0.0000	0.6039	0.0000	0.2103	0.0000	0.3161	0.0000	0.3275	0.0000
0.1831	0.3600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7025	0.5400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.3048	1.7720	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.0267	0.0000	1.2658	0.0000	0.2296	0.0000	2.0657	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.3137	0.0000	3.0465	0.3806	3.2134	0.2289	3.3300	0.1241
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3249	1.2048	9.3776	0.0000	6.5734	0.3806	6.0361	0.2289	8.0277	0.1241
4.5297		9.3776		6.9540		6.2650		8.1518	

P417		P418		P419		P420		P421	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7496	0.0000	0.0000	0.0000	1.6925	0.0000	1.6021	0.0000	1.6925	0.0000
0.3551	0.0000	0.0000	0.0000	0.0000	0.0000	0.5682	0.0000	0.0000	0.0000
0.1001	0.0000	0.0000	0.0000	0.0000	0.0000	0.3747	0.0000	0.0000	0.0000
0.7851	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2500	0.0000	1.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7100	0.0000	0.4010	0.0000	0.0000	0.0000	0.0969	0.0000	0.0000	0.0000
0.0323	0.0000	0.0000	0.0000	0.0000	0.0000	1.3279	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5685	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4275	0.0000	0.0000	0.0000	0.5281	0.0000	1.9400	0.0000	0.5281	0.0000
0.0000	0.0000	0.0000	0.0000	1.6639	0.0000	0.4011	0.0000	1.6639	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.3242	0.0000	1.6593	0.0000	3.3242	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5334	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.4097	0.0000	1.6510	0.0000	7.2088	0.0000	9.0721	0.0000	7.2088	0.0000
5.4097		1.6510		7.2088		9.0721		7.2088	

P422		P423		P424		P425		P426	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4364	0.0000	1.3989	0.0000	1.3989	0.0000	1.8000	0.0000	1.8000	0.0000
0.5489	0.0000	0.3685	0.0000	0.3685	0.0000	0.0000	0.0000	0.0000	0.0000
0.3230	0.0000	0.1279	0.0000	0.1279	0.0000	0.0000	0.0000	0.0000	0.0000
0.0984	0.0000	0.3035	0.0000	0.3035	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9490	0.0000	0.0616	0.0000	0.0616	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4173	0.0000	0.4173	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1129	0.0000	0.1129	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4084	0.0000	1.7122	0.0000	1.7122	0.0000	0.5976	0.0000	0.7682	0.0000
0.0000	0.0000	0.4385	0.0000	0.4385	0.0000	1.8846	0.0000	3.0762	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4106	0.0000	1.8383	0.0000	1.8383	0.0000	3.3056	0.1891	2.8099	0.1024
0.0000	0.0000	0.0663	0.0000	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.1746	0.0000	6.8460	0.0000	6.8460	0.0000	7.5877	0.1891	8.4543	0.1024
6.1746		6.8460		6.8460		7.7768		8.5568	

P427		P428		P429		P430		P431	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.4201	0.0000	1.4902	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3627	0.0000	0.3739	0.0000	0.0695	0.0000	0.7400	0.0000
0.0000	0.0000	0.1121	0.0000	0.1297	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4696	0.0000	0.0750	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0611	0.0000	0.0679	0.0000	0.0000	0.0000	0.7187	0.0000
0.0000	0.0000	0.3443	0.0000	1.1300	0.0000	0.4746	0.0000	1.7500	0.0000
0.0000	0.0000	0.0000	0.0000	0.9888	0.0000	0.0000	0.0000	0.1272	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0171	0.4717	2.6500	0.0009
0.0000	0.0000	1.7821	0.0000	1.8514	0.0000	0.0000	0.0000	0.0000	0.0000
3.1399	0.0000	0.6008	0.0000	0.4026	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1828	0.4898	1.7081	0.0000	1.8620	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.1602	0.0000	0.4214	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.1227	0.4898	8.0212	0.0000	8.7929	0.0000	2.5612	0.4717	5.9859	0.0009
8.6125		8.0212		8.7929		3.0329		5.9868	

P433		P434		P436		P437		P438	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.8000	0.0000	1.5593	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1020	0.0000	0.2325	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6039	0.0000	0.4265	0.0000
1.4187	0.0000	0.3480	0.2293	0.0000	0.0000	0.0000	0.0000	1.7500	0.3600
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2935	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.4243	2.2186	0.5400	0.0000	0.0000	0.0000	0.0000	2.6500	0.5400
0.0000	0.0000	0.0000	0.0000	0.7163	0.0000	1.7720	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.1700	0.0000	2.0267	0.0000	2.4745	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.3076	0.3957	3.3137	0.0000	3.3300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.0687	0.4243	2.5665	0.7693	8.9939	0.3957	9.3776	0.0000	12.1570	0.9000
4.4930		3.3358		9.3896		9.3776		13.0570	

P439		P440		P441		P442		P443	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.3517	0.0000	1.3949	0.0000	1.3949	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3632	0.0000	0.3632	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1027	0.0000	0.1027	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4482	0.0000	0.4482	0.0000
0.2516	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5768	0.0000	0.2577	0.0000	0.0000	0.0000	0.9792	0.0000	0.9792	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1808	0.0000	0.1808	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1107	0.0000	1.2367	0.0000	0.0000	0.0000	1.6936	0.0000	1.6936	0.0000
1.8099	0.0000	1.3299	0.0000	1.5154	0.0031	0.5471	0.0000	0.5471	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9743	0.4781	2.3865	0.1604	3.1696	0.6800	1.6428	0.0000	1.6428	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0975	0.0000	0.0975	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.5234	0.4781	7.0108	0.1604	6.0367	0.6831	7.4500	0.0000	7.4500	0.0000
7.0015		7.1712		6.7198		7.4500		7.4500	

P444		P445		P446		P447		P448	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3201	0.0000	0.0000	0.0000	0.0000	0.0000	0.6842	0.0000	0.0000	0.0000
0.3349	0.0000	0.0000	0.0000	0.0000	0.0000	0.3551	0.0000	0.0000	0.0000
0.0585	0.0000	0.0000	0.0000	0.0000	0.0000	0.1073	0.0000	0.0000	0.0000
0.3318	0.0000	0.0000	0.0000	0.0000	0.0000	0.7979	0.0000	0.0000	0.0000
0.2502	0.0000	0.1051	0.2500	1.2500	0.0000	1.2500	0.0000	0.1181	0.2500
1.6658	0.0000	0.0000	0.2881	0.7662	0.0000	1.7100	0.0000	0.0000	0.2749
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0886	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1896	0.0000	0.0000	0.0000	0.0000	0.0000	0.3666	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2619	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.4127	0.0000	0.1051	0.5381	2.0162	0.0000	5.3597	0.0000	0.1181	0.5249
6.4127		0.6433		2.0162		5.3597		0.6430	

P449		P450		P451		P452		P453	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6809	0.0000	1.8000	0.0000	1.6925	0.0000	1.7997	0.0000	1.8000	0.0000
0.5695	0.0000	0.0000	0.0000	0.0000	0.0000	0.1622	0.0000	0.2828	0.0000
0.3857	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3647	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0833	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.8114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0697	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9400	0.0000	0.0824	0.0000	0.5281	0.0000	0.9429	0.0000	0.9524	0.0000
1.0868	0.0000	1.3660	0.0000	1.6639	0.0000	1.7617	0.0000	2.3824	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6393	0.0000	3.0604	0.3903	3.3242	0.0000	3.3143	0.0000	2.1460	0.3252
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10.6314	0.0000	6.3088	0.3903	7.2088	0.0000	7.9807	0.0000	7.5636	0.3252
10.6314		6.6992		7.2088		7.9807		7.8888	

P454		P455		P457		P458		P459	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6009	0.0000	1.8000	0.0000	1.5261	0.0000	1.5131	0.0000	1.5086	0.0000
0.0061	0.0000	0.0000	0.0000	0.6313	0.0000	0.4967	0.0000	0.4966	0.0000
0.0000	0.0000	0.0000	0.0000	0.4732	0.0000	0.3625	0.0000	0.3593	0.0000
0.0000	0.0000	0.0000	0.0000	0.0619	0.0000	0.0705	0.0000	0.0274	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4432	0.0000	0.0000	0.0000	0.0780	0.0000	0.0810	0.0000	0.0749	0.0000
0.0000	0.0000	0.0000	0.0000	0.4746	0.0000	0.6351	0.0000	0.7447	0.0000
0.0000	0.0000	0.0000	0.0000	0.0369	0.0000	0.1087	0.0000	0.4281	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0008	0.0000	0.0000	0.0000	1.8551	0.0000	1.8858	0.0000	1.8395	0.0000
1.4079	0.0000	2.4908	0.4162	0.4124	0.0000	0.4466	0.0000	0.5849	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1480	0.0000	2.9958	0.6800	1.6139	0.0000	1.6655	0.0000	2.1787	0.0000
0.0000	0.0000	0.0000	0.0000	0.1561	0.0000	1.1919	0.0000	1.1800	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.6069	0.0000	7.2866	1.0962	7.3195	0.0000	8.4574	0.0000	9.4228	0.0000
7.6069		8.3828		7.3195		8.4574		9.4228	

P460		P461		P462		P463		P464	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6625	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.6462	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.5112	0.0000
0.3418	0.0000	1.1817	0.0000	1.0685	0.0000	0.4961	0.0000	0.0000	0.0000
1.7531	0.0000	2.2314	0.0000	1.3287	0.0000	2.1806	0.0000	0.1861	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	3.3300	0.1169	2.3889	0.1742	2.1140	0.3486	2.8030	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.0874	0.0000	8.5431	0.1169	6.5861	0.1742	6.5908	0.3486	7.1466	0.0000
7.0874		8.6599		6.7603		6.9394		7.1466	

P465		P466		P467		P468		P469	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	1.8000	0.0000	1.8000	0.0000	1.6665	0.0000
0.0000	0.0000	0.5866	0.0000	0.0000	0.0000	0.0894	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4747	0.0000	0.0000	0.0000	0.3104	0.0000	0.1970	0.0000
0.0000	0.0000	1.7500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.6500	0.2393	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4983	0.0000	0.0000	0.0000	0.0000	0.0000	0.9218	0.0000	1.0468	0.0000
2.4207	0.0000	0.0000	0.0000	1.2657	0.0000	2.3140	0.0000	1.8915	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.1116	0.4471	0.0000	0.0000	3.0390	0.4002	2.1333	0.3217	3.3046	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.8305	0.4471	5.4613	0.2393	6.1047	0.4002	7.5688	0.3217	8.1064	0.0000
7.2777		5.7006		6.5049		7.8905		8.1064	

P470		P471		P472		P473		P474	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6634	0.0000	1.8000	0.0000	0.0000	0.0000	1.8000	0.0000	1.5382	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7063	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5209	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.2500	0.0000	0.0000	0.0000	0.0000	0.0000
0.3187	0.0000	0.0000	0.0000	0.8670	0.0000	0.0000	0.0000	0.0131	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0999	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5623	0.0000
1.6490	0.0000	1.2657	0.0000	0.0000	0.0000	1.1024	0.0000	0.1228	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.2435	0.0000	3.0390	0.4002	0.0000	0.0000	2.9827	0.4286	1.5162	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.9744	0.0000	6.1047	0.4002	2.1170	0.0000	5.8852	0.4286	5.9797	0.0000
7.9744		6.5049		2.1170		6.3138		5.9797	

P475		P476		P477		P478		P479	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6132	0.0000	1.6915	0.0000	1.8000	0.0000	1.8000	0.0000	1.5885	0.0000
0.5426	0.0000	0.0843	0.0000	0.0000	0.0000	0.0000	0.0000	0.4896	0.0000
0.4082	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3336	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0967	0.0000	0.3641	0.0000	0.0000	0.0000	0.0000	0.0000	0.0968	0.0000
1.3335	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3426	0.0000
0.5469	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4951	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9400	0.0000	1.1700	0.0000	0.8505	0.0000	1.1817	0.0000	1.9400	0.0000
0.4004	0.0000	1.6340	0.0000	2.1318	0.0000	2.2314	0.0000	0.3985	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6579	0.0000	3.2273	0.0000	3.3300	0.0000	3.3300	0.1169	1.6573	0.0000
0.5318	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5317	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.0712	0.0000	8.1712	0.0000	8.1123	0.0000	8.5431	0.1169	8.8736	0.0000
9.0712		8.1712		8.1123		8.6599		8.8736	

P480		P481		P482		P483		P484	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5885	0.0000	1.6678	0.0000	1.6634	0.0000	1.8000	0.0000	0.6397	0.0000
0.4896	0.0000	0.3169	0.0000	0.0000	0.0000	0.2225	0.0000	0.0000	0.0000
0.3336	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0444	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0968	0.0000	0.0000	0.0000	0.3187	0.0000	0.4427	0.0000	0.0000	0.0000
1.3426	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4951	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.3051	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9400	0.0000	1.9400	0.0000	1.0999	0.0000	1.1980	0.0000	0.0000	0.0000
0.3985	0.0000	2.3395	0.0000	1.6490	0.0000	2.2491	0.0000	2.1971	0.1656
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6573	0.0000	3.3300	0.0000	3.2435	0.0000	2.0932	0.3384	3.2883	0.6800
0.5317	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.8736	0.0000	10.9438	0.0000	7.9744	0.0000	8.0054	0.3384	6.1252	0.8456
8.8736		10.9438		7.9744		8.3438		6.9707	

P486		P487		P488		P489		P490	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.7200	0.0000	1.8000	0.0000	1.7049	0.0000	1.6915	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0843	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3641	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4685	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4944	0.0000	1.1700	0.0000
1.1024	0.0000	2.8271	0.0000	3.1700	0.0000	1.6788	0.0000	1.6340	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.9827	0.4286	3.3300	0.3637	3.3300	0.4369	3.3300	0.0000	3.2273	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.8852	0.4286	7.8771	0.3637	8.7685	0.4369	7.2081	0.0000	8.1712	0.0000
6.3138		8.2408		9.2054		7.2081		8.1712	

P491		P492		P493		P495		P496	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4484	0.0000	1.7817	0.0000	1.6181	0.0000	1.8000	0.0000	1.6804	0.0000
0.5217	0.0000	0.2078	0.0000	0.7059	0.0000	0.0000	0.0000	0.0000	0.0000
0.3578	0.0000	0.0000	0.0000	0.5908	0.0000	0.0000	0.0000	0.0000	0.0000
0.0885	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9485	0.0000	0.3235	0.0000	0.0573	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4958	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4023	0.0000	1.3423	0.0000	1.9400	0.0000	1.2768	0.0000	0.0000	0.0000
0.0000	0.0000	1.8078	0.0000	0.5241	0.0000	3.0422	0.0000	1.6489	0.5492
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4068	0.0000	3.2811	0.0000	1.6960	0.0000	2.5132	0.1682	2.7620	0.6800
0.0000	0.0000	0.0000	0.0000	0.2630	0.0000	0.8780	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.1739	0.0000	8.7442	0.0000	7.8910	0.0000	9.5103	0.1682	6.0913	1.2292
6.1739		8.7442		7.8910		9.6785		7.3205	

P497		P498		P499		P500		P501	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5712	0.0000	1.5663	0.0000	1.8000	0.0000	1.8000	0.0000	1.5819	0.0000
0.1131	0.0000	0.3492	0.0000	0.0000	0.0000	0.0000	0.0000	0.3490	0.0000
0.0000	0.0000	0.0937	0.0000	0.0000	0.0000	0.0000	0.0000	0.1285	0.0000
0.0164	0.0000	0.7165	0.0000	0.0000	0.0000	0.0000	0.0000	0.7960	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0526	0.0000	0.0000	0.0000	0.0000	0.0000	0.0735	0.0000
0.0000	0.0000	0.1891	0.0000	0.0000	0.0000	0.0000	0.0000	0.6138	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7982	0.0000
0.8974	0.0000	1.5884	0.0000	0.5754	0.0000	0.6667	0.0000	1.7797	0.0000
1.1926	0.0000	0.8997	0.0000	1.3607	0.0000	3.1700	0.0000	1.0302	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.2383	0.0000	2.5769	0.0000	2.4134	0.2460	3.3300	0.5637	2.7236	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.0290	0.0000	8.0325	0.0000	6.1495	0.2460	9.9667	0.5637	9.8745	0.0000
7.0290		8.0325		6.3954		10.5304		9.8745	

P502		P503		P504		P505		P506	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	1.4249	0.0000	1.4249	0.0000	1.4018	0.0000
0.0000	0.0000	0.0000	0.0000	0.3563	0.0000	0.3563	0.0000	0.3586	0.0000
0.0000	0.0000	0.0000	0.0000	0.1359	0.0000	0.1359	0.0000	0.1362	0.0000
0.0000	0.0000	0.0000	0.0000	0.4588	0.0000	0.4588	0.0000	0.3893	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.9926	0.0000	0.9926	0.0000	0.9889	0.0000
0.0000	0.0000	0.3803	0.3066	0.5017	0.0000	0.5017	0.0000	0.4055	0.0000
0.0000	0.0000	0.0000	0.0000	0.1166	0.0000	0.1166	0.0000	0.1130	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.6500	0.5400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6667	0.0000	0.0000	0.0056	1.7451	0.0000	1.7451	0.0000	1.6965	0.0000
3.1700	0.0000	0.0000	0.0000	0.3989	0.0000	0.3989	0.0000	0.4333	0.0000
1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.5637	0.0000	0.0000	1.6335	0.0000	1.6335	0.0000	1.8336	0.0000
0.0000	0.0000	0.0000	0.0000	1.0976	0.0000	1.0976	0.0000	0.0531	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9.9667	0.5637	3.0303	0.8523	8.8620	0.0000	8.8620	0.0000	7.8097	0.0000
10.5304		3.8826		8.8620		8.8620		7.8097	

P507		P508		P509		P510		P511	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.8000	0.0000
0.0444	0.0000	0.0000	0.0000	0.2313	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3240	0.0000	0.0000	0.0000	0.6199	0.0000	0.0000	0.0000	0.2623	0.0000
0.0000	0.0000	0.0000	0.0000	0.0718	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8240	0.0000	0.5572	0.0000	1.5648	0.0000	0.3835	0.0000	1.2648	0.0000
3.1700	0.0044	1.0343	0.0000	2.6284	0.0000	1.6629	0.0000	1.4674	0.0000
0.8047	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5134	0.6800	2.2441	0.3514	2.5232	0.1046	3.2106	0.3125	2.7014	0.0413
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10.4804	0.6844	5.6356	0.3514	9.4395	0.1046	7.0569	0.3125	7.4958	0.0413
11.1649		5.9870		9.5440		7.3694		7.5371	

P512		P513		P514		P516		P517	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.5633	0.0000	1.8000	0.0000	1.8000	0.0000
0.0000	0.0000	0.2466	0.0000	0.0964	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0263	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1375	0.0000
0.1843	0.0000	0.6884	0.0000	0.6041	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1535	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7180	0.0000	1.9400	0.0000	1.7727	0.0000	0.1410	0.0000	0.0000	0.0000
2.2013	0.0000	3.1590	0.0000	2.0274	0.0000	1.5218	0.0000	0.8640	0.0000
0.0000	0.0000	0.0581	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.1149	0.3313	3.3300	0.0000	3.3138	0.0000	3.3300	0.2753	3.0486	0.1089
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.0186	0.3313	11.4019	0.0000	9.3777	0.0000	6.7927	0.2753	5.8500	0.1089
7.3499		11.4019		9.3777		7.0680		5.9589	

P519		P520		P521		P522		P523	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5663	0.0000	0.6770	0.0000	0.6770	0.0000	0.0000	0.0000	1.8000	0.0000
0.4040	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1890	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6590	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0646	0.0000	0.0000	0.0000	0.0000	0.0000	1.6819	0.0000	0.0000	0.0000
0.4031	0.0000	0.0000	0.0000	0.0000	0.0000	1.7500	0.3600	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6500	0.5400	0.0000	0.0000
1.6730	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6365	0.0000
0.7119	0.0000	2.2739	0.1398	2.2739	0.1398	3.1700	0.0000	2.5574	0.3231
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.4325	0.0000	3.3300	0.6800	3.3300	0.6800	3.3300	0.0000	2.2719	0.6800
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.1034	0.0000	6.2809	0.8198	6.2809	0.8198	12.5819	0.9000	7.2658	1.0031
8.1034		7.1007		7.1007		13.4819		8.2689	

P524		P525		P526		P527		P528	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.7269	0.0000	1.5663	0.0000	1.5190	0.0000	1.8000	0.0000
0.0000	0.0000	0.0565	0.0000	0.4040	0.0000	0.4185	0.0000	0.2704	0.0000
0.0000	0.0000	0.0000	0.0000	0.1890	0.0000	0.2092	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.6590	0.0000	0.0888	0.0000	0.0000	0.0000
0.1245	0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2702	0.0000	0.0000	0.0646	0.0000	0.0688	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4031	0.0000	1.1326	0.0000	0.0290	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9930	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.8102	0.0000	1.6730	0.0000	1.8578	0.0000	1.9400	0.0000
0.0000	0.0000	1.5656	0.0000	0.7119	0.0000	0.4079	0.0000	1.5936	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0760	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.2466	0.0000	2.4325	0.0000	1.8665	0.0000	2.4672	0.0646
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4266	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1245	0.5202	7.4057	0.0000	8.1034	0.0000	8.9889	0.0000	8.1763	0.0646
0.6447		7.4057		8.1034		8.9889		8.2409	

P529		P531		P532		P533		P535	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.3403	0.0000	0.0000	0.0000	0.0000	0.0000	1.7085	0.0000
0.1080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.1245	0.2500	0.6059	0.1551	0.0000	0.0000
0.4115	0.0000	0.0000	0.0000	0.0000	0.2702	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0810	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4887	0.0000
2.1722	0.0000	1.4925	0.1584	0.0000	0.0000	0.0000	0.0000	1.6813	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.0774	0.3413	2.9206	0.6800	0.0000	0.0000	0.0000	0.0000	3.3300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.6500	0.3413	5.7534	0.8384	0.1245	0.5202	0.6059	0.1551	7.2085	0.0000
7.9913		6.5918		0.6447		0.7611		7.2085	

P536		P537		P538		P539		P540	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.8000	0.0000	1.8000	0.0000	1.7215	0.0000	1.8000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1297	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1395	0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2748	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0950	0.0000	0.0000	0.0000
0.0000	0.0000	1.3114	0.0000	0.2891	0.0000	0.0000	0.0000	0.9471	0.0000
0.0000	0.0000	2.3046	0.0000	2.4829	0.3595	0.6040	0.0000	1.7832	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.3300	0.1108	2.2593	0.6800	2.9220	0.0000	3.3194	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1395	0.5248	8.7460	0.1108	6.8312	1.0395	7.3425	0.0000	7.9794	0.0000
0.6643		8.8569		7.8707		7.3425		7.9794	

P541		P542		P543		P544		P545	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5407	0.0000	1.4228	0.0000	1.7859	0.0000	1.8000	0.0000	1.5819	0.0000
0.5969	0.0000	0.3575	0.0000	0.0000	0.0000	0.0000	0.0000	0.3490	0.0000
0.5183	0.0000	0.1374	0.0000	0.0000	0.0000	0.0000	0.0000	0.1285	0.0000
0.0577	0.0000	0.4188	0.0000	0.0000	0.0000	0.0000	0.0000	0.7960	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0778	0.0000	0.0672	0.0000	0.0000	0.0000	0.0000	0.0000	0.0735	0.0000
0.4734	0.0000	0.4721	0.0000	0.0000	0.0000	0.0000	0.0000	0.6138	0.0000
0.0118	0.0000	0.0332	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.3199	0.0000	0.0000	0.0000	0.7982	0.0000
1.8532	0.0000	1.7736	0.0000	0.0000	0.0000	1.1325	0.0000	1.7797	0.0000
0.4155	0.0000	0.4269	0.0000	3.1700	0.0000	2.7395	0.2016	1.0302	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6154	0.0000	1.6583	0.0000	3.3300	0.3826	2.3459	0.6800	2.7236	0.0000
0.1579	0.0000	1.1312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.3186	0.0000	7.8990	0.0000	8.6058	0.3826	8.0180	0.8816	9.8745	0.0000
7.3186		7.8990		8.9885		8.8996		9.8745	

P546		P547		P548		P549		P550	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.8000	0.0000	1.8000	0.0000	1.5762	0.0000	1.5853	0.0000
0.4337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3503	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1119	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6888	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2906	0.0000	0.0000	0.0000	0.0000	0.0000	0.2409	0.0000	0.9787	0.0000
1.7500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5436	0.0000
1.2853	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.2963	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9505	0.0000
0.0000	0.0000	1.4739	0.0000	0.3835	0.0000	0.8010	0.0000	1.8318	0.0000
0.0000	0.0000	2.3726	0.0000	1.6629	0.0000	1.6804	0.0000	1.0669	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.3300	0.0873	3.2106	0.3125	3.2454	0.0000	2.7296	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.4095	0.2963	8.9765	0.0873	7.0569	0.3125	7.5439	0.0000	10.8373	0.0000
6.7058		9.0639		7.3694		7.5439		10.8373	

P551		P552		P553		P555		P556	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4018	0.0000	1.4391	0.0000	0.0000	0.0000	1.8000	0.0000	1.4275	0.0000
0.3586	0.0000	0.3631	0.0000	0.0000	0.0000	0.0235	0.0000	0.4131	0.0000
0.1362	0.0000	0.1396	0.0000	0.0000	0.0000	0.0000	0.0000	0.2073	0.0000
0.3893	0.0000	0.2249	0.0000	0.0000	0.0000	0.0000	0.0000	0.3203	0.0000
0.0000	0.0000	0.2589	0.0000	0.1273	0.2500	0.0000	0.0000	0.0000	0.0000
0.9889	0.0000	1.7100	0.0000	0.0000	0.2665	0.1633	0.0000	0.0624	0.0000
0.4055	0.0000	0.6852	0.0000	0.0000	0.0000	0.0000	0.0000	0.4193	0.0000
0.1130	0.0000	0.3973	0.0000	0.0000	0.0000	0.0000	0.0000	0.1109	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6965	0.0000	1.6717	0.0000	0.0000	0.0000	0.9271	0.0000	1.7206	0.0000
0.4333	0.0000	0.0155	0.0000	0.0000	0.0000	1.0855	0.0000	0.4444	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8336	0.0000	1.4457	0.0000	0.0000	0.0000	2.2681	0.2800	1.8431	0.0000
0.0531	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0731	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.8097	0.0000	8.3509	0.0000	0.1273	0.5165	6.2674	0.2800	7.0418	0.0000
7.8097		8.3509		0.6438		6.5474		7.0418	

P557		P559		P560		P561		P562	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4275	0.0000	1.8000	0.0000	1.8000	0.0000	1.4310	0.0000	1.4658	0.0000
0.4131	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5945	0.0000
0.2073	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4050	0.0000
0.3203	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1239	0.0000
0.0000	0.0000	0.5951	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0624	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9496	0.0000
0.4193	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1109	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7206	0.0000	1.7492	0.0000	0.0000	0.0000	0.0000	0.0000	1.4168	0.0000
0.4444	0.0000	3.1700	0.0000	0.9686	0.0000	1.9971	0.0820	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8431	0.0000	2.5945	0.1319	2.9705	0.4206	3.0976	0.6800	1.4170	0.0000
0.0731	0.0000	0.2674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.0418	0.0000	10.1762	0.1319	5.7391	0.4206	6.5257	0.7620	6.3727	0.0000
7.0418		10.3081		6.1597		7.2877		6.3727	

P563		P564		P566		P567		P568	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9131	0.0000	1.8000	0.0000	1.3403	0.0000	0.0000	0.0000	1.7269	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0565	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1245	0.2500	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2702	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.9517	0.0000	0.0000	0.0000	0.0000	0.0000	0.8102	0.0000
1.5442	0.0000	2.0994	0.0000	1.4925	0.1584	0.0000	0.0000	1.5656	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.1722	3.3300	0.1276	2.9206	0.6800	0.0000	0.0000	3.2466	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.7873	0.1722	8.1811	0.1276	5.7534	0.8384	0.1245	0.5202	7.4057	0.0000
5.9596		8.3086		6.5918		0.6447		7.4057	

P569		P570		P571		P572		P573	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.8000	0.0000	1.4778	0.0000	1.7579	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5672	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4404	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1156	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9490	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1414	0.0000	0.6680	0.0000	0.2891	0.0000	1.4095	0.0000	0.0000	0.0000
1.5210	0.0000	2.3726	0.0000	2.4829	0.3595	0.0000	0.0000	1.7429	0.5299
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.2754	2.4362	0.2180	2.2593	0.6800	1.4126	0.0000	2.7901	0.6800
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.7924	0.2754	7.2769	0.2180	6.8312	1.0395	6.3722	0.0000	6.2908	1.2099
7.0678		7.4949		7.8707		6.3722		7.5007	

P574		P575		P576		P577		P578	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	1.4303	0.0000	0.0000	0.0000	1.7389	0.0000
0.0000	0.0000	0.4299	0.0000	0.4029	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2134	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4147	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1060	0.2500	0.0000	0.0000
0.0000	0.0000	0.3865	0.0000	0.9894	0.0000	0.0000	0.2912	0.0000	0.0000
0.0000	0.0000	1.7500	0.0000	0.3361	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.6500	0.1750	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.7110	0.0000	0.0000	0.0000	0.4529	0.0000
2.8582	0.3279	0.0000	0.0000	0.3713	0.0000	0.0000	0.0000	2.0169	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1511	0.6800	0.0000	0.0000	1.5874	0.0000	0.0000	0.0000	3.3300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0677	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.8093	1.0079	5.2164	0.1750	7.5241	0.0000	0.1060	0.5412	7.5388	0.0000
8.8172		5.3914		7.5241		0.6473		7.5388	

P579		P580		P581		P582		P586	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4562	0.0000	1.4562	0.0000	0.6633	0.0000	1.2992	0.0000	0.0000	0.0000
0.4578	0.0000	0.4578	0.0000	0.0000	0.0000	0.2149	0.0000	0.0000	0.0000
0.2874	0.0000	0.2874	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3398	0.0000	0.3398	0.0000	0.0000	0.0000	0.3773	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0631	0.0000	0.0631	0.0000	0.0000	0.0000	0.8666	0.0000	0.0000	0.0000
0.4205	0.0000	0.4205	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1097	0.0000	0.1097	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.5484	0.0000	0.0000	0.0000	0.0000	0.0000
1.7279	0.0000	1.7279	0.0000	0.0000	0.0000	1.1371	0.0000	0.0000	0.0000
0.4496	0.0000	0.4496	0.0000	0.0000	0.0000	0.0243	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8473	0.0000	1.8473	0.0000	1.9529	0.3682	1.3032	0.0000	2.5241	0.0000
0.0789	0.0000	0.0789	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.2383	0.0000	7.2383	0.0000	3.1646	0.3682	5.2226	0.0000	2.5241	0.0000
7.2383		7.2383		3.5329		5.2226		2.5241	

P589		P593		P594		P595		P598	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5507	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5886	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7568	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8715	0.0000
0.0762	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3497	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.0000	0.0000	0.1186	0.0000	0.1186	0.0000	0.1186	2.6500	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2800	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.3137	0.0000	0.0000	0.1186	0.0000	0.1186	0.0000	0.1186	5.7398	0.0000
5.3137		0.1186		0.1186		0.1186		5.7398	

P608		P609		P610		P611		P612	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.7430	0.0000	1.7613	0.0000	0.6169	0.0000	1.3652	0.0000	1.3262	0.0000
0.3051	0.0000	0.0000	0.0000	0.3035	0.0000	0.2247	0.0000	0.3579	0.0000
0.0443	0.0000	0.0000	0.0000	0.0412	0.0000	0.0000	0.0000	0.1086	0.0000
0.7013	0.0000	0.0000	0.0000	0.7540	0.0000	0.1614	0.0000	0.3687	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0521	0.0000	0.0000	0.0000	0.9813	0.0000	0.0000	0.0000	0.0445	0.0000
0.3460	0.0000	0.0000	0.0000	0.2882	0.0000	0.0000	0.0000	0.0804	0.0000
0.2457	0.0000	0.0000	0.0000	0.1989	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2693	0.0000	0.0000	0.0000	0.0119	0.0000	0.8586	0.0000	0.9623	0.0000
0.0000	0.0000	0.4429	0.0000	0.0000	0.0000	0.2442	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.5741	0.0126	0.0000	0.0000	2.2262	0.0000	1.2381	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.7068	0.0000	4.7783	0.0126	3.1958	0.0000	5.0803	0.0000	4.4867	0.0000
2.7068		4.7909		3.1958		5.0803		4.4867	

P613		P615		P616		P617		P618	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2710	0.0000	1.2710	0.0000	0.3534	0.0000	0.3534	0.0000	1.1840	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1922	0.0000	2.1622	0.0000	2.0900	0.0000	2.0900	0.0000	1.4992	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3075
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3936	0.0301	1.3936	0.0301	0.9607	0.2802	0.9607	0.2802	1.7558	0.6800
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.8568	0.0301	4.8268	0.0301	3.4041	0.2802	3.4041	0.2802	4.4390	0.9875
2.8869		4.8569		3.6842		3.6842		5.4264	

P619		P620		P621		P623		P624	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.3742	0.0000	0.6468	0.0000	0.6468	0.0000	0.7500	0.0000	1.8000	0.0000
0.3357	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0644	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1784	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1032	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9554	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.2943	0.0000	2.2943	0.0000	2.3327	0.0000	0.0000	0.0000
1.8248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0656	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5467	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5094	0.0000	0.9681	0.3284	0.9681	0.3284	1.0276	0.3152	2.6223	0.4577
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.2327	0.0000	3.9091	0.3284	3.9091	0.3284	4.1103	0.3152	5.1474	0.4577
6.2327		4.2375		4.2375		4.4255		5.6051	

P625		P626		P627		P628		P633	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4348	0.0000	1.2799	0.0000	0.7523	0.0000	0.0000	0.0000	0.0000	0.0000
0.4925	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3704	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0749	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2534	0.0000	0.0000	0.0000
0.1110	0.0000	0.0000	0.0000	0.0000	0.0000	1.3559	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5888	0.3600	0.0000	0.0000
0.3088	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5157	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.3322	0.0000	1.6652	0.5400	2.6500	0.1360
1.9400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3900	0.0000	0.0000
0.5804	0.0000	1.4479	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7226	0.0000	3.3300	0.3329	1.0257	0.3158	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7100	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6.9603	0.0000	6.0577	0.3329	4.1102	0.3158	3.8633	1.2900	3.9506	0.1360
6.9603		6.3906		4.4260		5.1533		4.0866	

P634		P636		P637		P638		P639	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.7615	0.0000	1.4554	0.0000	1.3026	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2453	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0706	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1951	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1270	0.0000
1.1774	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0263	0.0000	0.0000	1.5262	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6653	0.0000
0.0000	0.0000	2.0217	0.0000	0.9157	0.0441	0.0000	0.1535	0.3679	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.3300	0.0000	1.6704	0.6800	1.5425	0.6800	1.7007	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4431	0.0000	5.3517	0.0263	4.3477	0.7241	4.5240	0.8335	4.4088	0.0000
1.4431		5.3781		5.0718		5.3575		4.4088	

P640		P642		P643		P644		P645	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.8000	0.0000	1.2582	0.0000	1.8000	0.0000	1.2134	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4305	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	2.6500	0.0000	2.3503	0.0000	0.0000	0.0000	2.6500	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1516	0.0000	0.0000	0.0000	0.0000	0.0000	1.1590	0.0800	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.2493	2.4046	0.1690	0.9932	0.5453	1.7059	0.6800	1.2958	0.5133
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8.2816	0.2493	7.2851	0.1690	4.6016	0.5453	4.6648	0.7600	5.1591	0.5133
8.5309		7.4541		5.1469		5.4248		5.6724	

P646		P647		P648		P649		P651	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	1.3277	0.0000	1.3954	0.0000	1.8000	0.0000	1.0546	0.0000
0.0000	0.0000	0.3088	0.0000	0.3605	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0263	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0416	0.0000	0.3073	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0092	0.0000	0.2483	0.0000	0.0000	0.0000
0.0000	0.0000	0.1672	0.0000	1.0876	0.0000	0.3284	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.3865	0.0000
0.0000	0.0000	0.7181	0.0000	1.5057	0.0000	0.0000	0.0000	0.0000	0.0000
1.4830	0.0000	0.3569	0.0000	0.1482	0.0000	0.0000	0.0000	0.0000	0.3907
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8186	0.6565	1.6828	0.0000	1.5601	0.0000	1.5968	0.0000	0.4602	0.6800
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5.1016	0.6565	4.6029	0.0000	6.4002	0.0000	3.9735	0.0000	3.9013	1.0707
5.7581		4.6029		6.4002		3.9735		4.9720	

P652		P655		P658		P665		P667	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.8000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0603	0.0000	0.2432	0.0000
0.0350	0.0000	0.0000	0.0000	0.0000	0.0000	0.1020	0.0000	0.0586	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3668	0.0000	0.2932	0.0000
0.2507	0.0000	0.0000	0.0864	0.0113	0.0000	0.0000	0.0000	0.0000	0.0000
0.8007	0.0000	0.0000	0.3500	0.0000	0.0000	1.4924	0.0000	1.4467	0.0000
0.4728	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.9786	0.0000	0.0000	0.4364	0.0113	0.0000	2.0215	0.0000	2.0417	0.0000
4.9786		0.4364		0.0113		2.0215		2.0417	

P668		P669		P670		P671		P673	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4828	0.0000	1.0525	0.0000	0.9478	0.0000	0.0000	0.0000	0.0000	0.0000
0.1266	0.0000	0.0000	0.0000	0.2660	0.0000	0.0000	0.0000	0.0013	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4060	0.0000	0.1384	0.0000	0.0039	0.0000	0.0000	0.0000	0.2658	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.5168	0.0000	1.3226	0.0000	1.6451	0.0000	0.2552	0.0000	1.4423	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.6730	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0136	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.5322	0.0000	2.5271	0.0000	3.5359	0.0000	0.2552	0.0000	1.7093	0.0000
2.5322		2.5271		3.5359		0.2552		1.7093	

P674		P675		P676		P677		P679	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3846	0.0000	0.1264	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2924	0.0000	0.2044	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0917	0.0000	0.5287	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6771	0.0000	1.5994	0.0000	0.2120	0.0000	0.6492	0.0000	0.0000	0.1366
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1214	0.0000	0.3229
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.8845	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.4458	0.0000	2.4589	0.0000	0.2120	0.0000	0.6492	0.1214	2.8845	0.4595
2.4458		2.4589		0.2120		0.7706		3.3440	

P680		P681		P684		P686		P687	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.6606	0.0000	0.7637	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3050	0.0000	0.5043	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0396	0.0000	0.3008	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.6931	0.0000	0.6183	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5713	0.0000	1.7100	0.0000	1.7100	0.0000	0.3324	0.0000	0.7594	0.0000
0.0000	0.0000	0.0903	0.0000	0.1368	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4142	0.0000	0.6248	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5713	0.0000	3.9128	0.0000	4.6586	0.0000	0.3324	0.0000	0.7594	0.0000
0.5713		3.9128		4.6586		0.3324		0.7594	

P689		P690		P691		P692		P695	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2051	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5396	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5809	0.0000	0.7594	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.5400	0.0000	0.5400	0.0000	0.5400	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2204	0.0000	1.2204	0.0000	1.2204	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6088	0.0000	1.6088	0.0000	1.6088	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.8291	0.5400	2.8291	0.5400	2.8291	0.5400	2.3256	0.0000	0.7594	0.0000
3.3691		3.3691		3.3691		2.3256		0.7594	

P698		P699		P701		P704		P706	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7522	0.0000
0.0000	0.0000	0.0719	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.2150	0.0000	0.0000	0.0000	0.1098	0.0000	0.0000	0.0000
0.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.2097	0.0000	0.0000	0.0099	1.1902	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.1547	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.1700	0.0000	0.0000	0.0000	0.7960	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0414	0.0000	0.0000	0.0000	3.2691	0.2153
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2500	0.0000	1.4966	0.0000	3.2114	0.1645	1.3000	0.0000	4.8172	0.2153
0.2500		1.4966		3.3759		1.3000		5.0324	

P707		P709		P716		P728		P729	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3114	0.0000	0.6128	0.0000	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3496	0.0000	0.1299	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.7162	0.0000	0.3900	0.0000	0.3323	0.0000	0.3323	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	1.7100	0.0000	1.4661	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3177	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.2334	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.0026	0.3358	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.9641	0.3358	4.2630	0.0000	2.2542	0.0000	0.3323	0.0000	0.3323	0.0000
5.2998		4.2630		2.2542		0.3323		0.3323	

P730		P731		P734		P735		P742	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6162	0.0000	1.0841	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2616	0.0000	0.0308	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0151	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.0726	0.0000	1.0382	0.0000	0.0000	0.2311	0.0000	0.0000	0.7297	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0442	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1268	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.5400	0.3750	0.0000	0.0000	0.0000
0.0473	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.1700	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.5910	0.0000	1.3256	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.1839	0.0000	2.7441	0.0000	4.4956	0.7711	0.3750	0.0000	0.7297	0.0000
2.1839		2.7441		5.2668		0.3750		0.7297	

P746		P747		P750		P751		P754	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3319	0.0000	0.0000	0.0000	0.0000	0.0000	0.1238	0.0000
0.0000	0.0000	0.2696	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0153	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0855	1.0684	0.0000	0.0000	0.0000	0.3705	0.0000	1.0323	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0392	0.0000	0.0000	0.0000	0.0000	0.0000	0.6238	0.0000
0.0000	0.0000	0.3542	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.5978	0.0000	0.0000	0.0000	0.0417	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.5020	0.0000	0.0000	0.1618	0.0000	0.0000	0.1027	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9754	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.3300	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4.3054	0.5875	2.6765	0.0000	0.1618	0.0000	0.4123	0.1027	1.7799	0.0000
4.8929		2.6765		0.1618		0.5150		1.7799	

P756		P759		P764		P767		P769	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	1.1950	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2039	0.9315	0.0000	0.6599	0.0000	1.0257	0.0000	0.0000	0.1563
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3245	0.0000	0.0000	0.0000	0.6590	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1818	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.6470	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.9048	0.0000	0.0000	0.0000	1.9164	0.1570	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.5518	0.3858	1.2561	0.0000	3.7713	0.1570	1.6846	0.0000	0.0000	0.1563
3.9376		1.2561		3.9282		1.6846		0.1563	

P770		P771		P772		P773		P774	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4455	0.0000	0.3540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.4813	0.0000	0.4798	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2905	0.0000	0.2879	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2018	0.0000	1.2033	0.0000	0.5804	0.0000	0.0000	0.1513	0.0000	0.0089
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0452	0.0000	0.0474	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3507	0.0000	0.9126	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6035	0.0000	1.1892	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.4185	0.0000	4.4742	0.0000	0.5804	0.0000	0.0000	0.1513	0.0000	0.0089
3.4185		4.4742		0.5804		0.1513		0.0089	

P775		P776		P777		P778		P779	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0090	0.0000	0.0090	0.0000	0.0090	0.0000	0.0090
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0089	0.0000	0.0090	0.0000	0.0090	0.0000	0.0090	0.0000	0.0090
0.0089		0.0090		0.0090		0.0090		0.0090	

P780		P781		P782		P783		P784	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9948	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5115	0.0000	0.0000	0.0181	0.0000	0.0098	0.0000	0.0167	0.6571	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.9449	0.1513
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5115	0.0000	0.0000	0.0181	0.0000	0.0098	0.0000	0.0167	3.5968	0.1513
0.5115		0.0181		0.0098		0.0167		3.7480	

P785		P786		P787		P788		P789	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0156	0.0000	0.0158	0.1020	0.0000	0.0000	0.0089	0.0000	0.0090
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0156	0.0000	0.0158	0.1020	0.0000	0.0000	0.0089	0.0000	0.0090
0.0156		0.0158		0.1020		0.0089		0.0090	

P790		P791		P792		P793		P794	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.6939	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.3156	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2451	1.1070	0.0000	0.0000	0.0109	0.0000	0.0098	0.0000	0.0098
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0436	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1129	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7886	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.1961	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.9846	0.2451	2.3598	0.0000	0.0000	0.0109	0.0000	0.0098	0.0000	0.0098
4.2298		2.3598		0.0109		0.0098		0.0098	

P795		P796		P797		P798		P799	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6815	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3185	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0867	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.1070	0.0000	0.0000	0.0098	0.0000	0.0131	0.0000	0.0174	0.0000	0.0156
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0454	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1440	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1133	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.4964	0.0000	0.0000	0.0098	0.0000	0.0131	0.0000	0.0174	0.0000	0.0156
2.4964		0.0098		0.0131		0.0174		0.0156	

P800		P801		P802		P803		P804	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0131	0.0884	0.0000	0.0000	0.2083	0.0000	0.0642	0.0000	0.0653
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0131	0.0884	0.0000	0.0000	0.2083	0.0000	0.0642	0.0000	0.0653
0.0131		0.0884		0.2083		0.0642		0.0653	

P805		P806		P807		P808		P809	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0766	0.6338	0.0000	0.0000	0.1317	0.0000	0.1248	0.0000	0.1232
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0766	0.6338	0.0000	0.0000	0.1317	0.0000	0.1248	0.0000	0.1232
0.0766		0.6338		0.1317		0.1248		0.1232	

P810		P811		P812		P813		P814	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1232	1.0352	0.0000	0.0000	0.1283	0.6775	0.0000	0.0000	0.1317
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1232	1.0352	0.0000	0.0000	0.1283	0.6775	0.0000	0.0000	0.1317
0.1232		1.0352		0.1283		0.6775		0.1317	

P815		P816		P817		P818		P819	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1842	0.0000	0.1923	0.0000	0.1842	0.0000	0.0035	0.5112	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1842	0.0000	0.1923	0.0000	0.1842	0.0000	0.0035	0.5112	0.0000
0.1842		0.1923		0.1842		0.0035		0.5112	

P820		P821		P822		P823		P824	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0111	0.0000	0.0128	0.0000	0.0112	0.0000	0.0113	0.1962	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0111	0.0000	0.0128	0.0000	0.0112	0.0000	0.0113	0.1962	0.0000
0.0111		0.0128		0.0112		0.0113		0.1962	

P825		P826		P827		P828		P829	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0106	0.0000	0.0106	0.0000	0.0109	0.0000	0.0148	0.2422	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0106	0.0000	0.0106	0.0000	0.0109	0.0000	0.0148	0.2422	0.0000
0.0106		0.0106		0.0109		0.0148		0.2422	

P830		P831		P832		P833		P834	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2026	0.0000	0.0583	0.0000	0.0658	0.0000	0.0626	0.0000	0.0652
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.2026	0.0000	0.0583	0.0000	0.0658	0.0000	0.0626	0.0000	0.0652
0.2026		0.0583		0.0658		0.0626		0.0652	

P835		P836		P837		P838		P839	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1790	0.0000	0.1790	0.0000	0.0035	0.0000	0.0035	0.0000	0.0035
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1790	0.0000	0.1790	0.0000	0.0035	0.0000	0.0035	0.0000	0.0035
0.1790		0.1790		0.0035		0.0035		0.0035	

P840		P841		P842		P843		P844	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5112	0.0000	0.0000	0.0157	0.0000	0.0044	0.0000	0.0044	0.0000	0.0044
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5112	0.0000	0.0000	0.0157	0.0000	0.0044	0.0000	0.0044	0.0000	0.0044
0.5112		0.0157		0.0044		0.0044		0.0044	

P845		P846		P847		P848		P849	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5075	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0167	0.0000	0.0102	0.0000	0.0102	0.0000	0.0161	0.8071	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6147	0.1506
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0167	0.0000	0.0102	0.0000	0.0102	0.0000	0.0161	4.9293	0.1506
0.0167		0.0102		0.0102		0.0161		5.0799	

P850		P851		P852		P853		P854	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0104	0.0000	0.0104	0.0000	0.1985	0.0000	0.0585	0.0000	0.0658
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0104	0.0000	0.0104	0.0000	0.1985	0.0000	0.0585	0.0000	0.0658
0.0104		0.0104		0.1985		0.0585		0.0658	

P855		P856		P857		P858		P859	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0585	0.0000	0.0634	0.0000	0.0652	0.0000	0.1933	0.0000	0.1820
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0585	0.0000	0.0634	0.0000	0.0652	0.0000	0.1933	0.0000	0.1820
0.0585		0.0634		0.0652		0.1933		0.1820	

P860		P861		P862		P863		P868	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0531	0.0000	0.0594	0.0000	0.1111	0.0000	0.2068	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.5401	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0531	0.0000	0.0594	0.0000	0.1111	0.0000	0.2068	1.5401	0.0000
0.0531		0.0594		0.1111		0.2068		1.5401	

P872		P873		P880		P882		P884	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2834	0.0000	0.6207	0.0000	0.3796	0.0000
0.0000	0.0000	0.0000	0.0000	0.0602	0.0000	0.1744	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0732	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0848	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4247	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0026	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.3414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8825	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.0710	0.0000	1.1442	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.0710	0.0000	1.1442	0.3414	0.3436	0.0000	2.2629	0.0000	0.3796	0.0000
3.0710		1.4856		0.3436		2.2629		0.3796	

P885		P888		P889		P893		P899	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3814	0.0000	0.3839	0.0000	0.3974	0.0000	0.0000	0.0000	0.0000	0.0000
0.0151	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2500	0.0000	1.2500	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3103	0.0000	1.3103	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.6407	0.0000	2.6407	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3965	0.0000	0.3839	0.0000	0.3974	0.0000	5.2010	0.0000	5.2010	0.0000
0.3965		0.3839		0.3974		5.2010		5.2010	

P901		P902		P903		P906		P907	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.6282	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7659	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.1351	0.0000	0.1810	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0856	0.0000	0.0000	0.0000	0.0000	0.0000
1.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7100	0.0000	0.0000	0.0000	0.0721	0.0000	0.0957	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0716	0.0000	1.2175	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.8302	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.1487	0.0000	0.5400	0.0000	0.0000	0.0000	0.0000	0.0000	0.5400
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1243	0.0000	0.0000	0.0000
0.0000	0.2000	2.1971	0.0000	0.0000	0.0000	0.0000	0.0000	0.6471	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	3.3300	0.0000	0.0000	0.0000	0.0000	0.0000	3.3300	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.5182	0.3487	5.5271	0.5400	0.3643	0.0000	4.2146	0.0000	3.9771	0.5400
7.8669		6.0671		0.3643		4.2146		4.5171	

P908		P909		P910		P911		P912	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3934	0.0000	0.0000	0.0000	0.0000	0.0000	0.3557	0.0000	0.3388	0.0000
0.1672	0.0000	0.1351	0.0000	0.0000	0.0000	0.1667	0.0000	0.1665	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0640	0.0000	0.0856	0.0000	0.0000	0.0000	0.0660	0.0000	0.0922	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0658	0.0000	0.0721	0.0000	0.0000	0.0000	0.0645	0.0000	0.0652	0.0000
0.1282	0.0000	0.0716	0.0000	0.0000	0.0000	0.1077	0.0000	0.1221	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.2961	0.0000	0.0000	0.0000	0.0000
0.0860	0.0000	0.0000	0.0000	0.0000	0.0000	0.0263	0.0000	0.1367	0.0000
0.0000	0.0000	0.0000	0.0000	2.0581	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.1289	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9046	0.0000	0.3643	0.0000	4.1870	0.2961	0.7869	0.0000	0.9215	0.0000
0.9046		0.3643		4.4831		0.7869		0.9215	

P917		P918		P926		P927		P928	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.7571	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4397	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2405	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.1069	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0842	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4020	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0833	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.5400	0.0000	0.5400	0.0000	0.0000	0.0000	0.3636	0.0000	0.0379
0.0000	0.0000	0.0000	0.0000	0.8867	0.0000	0.0000	0.0000	0.0000	0.0000
1.2893	0.0000	1.2893	0.0000	0.0000	0.0000	3.1700	0.0000	3.0826	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6816	0.0000	2.6816	0.0000	0.0000	0.0000	1.3640	0.0000	0.0747	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.9710	0.5400	3.9710	0.5400	3.0005	0.0000	4.5340	0.3636	3.1573	0.0379
4.5110		4.5110		3.0005		4.8976		3.1952	

P931		P932		P933		P947		P948	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.3631	0.0000	0.3358	0.0000	0.0000	0.0000	1.6921	0.0000	0.0000	0.0000
0.1624	0.0000	0.1713	0.0000	0.0000	0.0000	0.0619	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0105	0.0000	0.0462	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0454	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.1107	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1054	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	3.1700	0.0000	0.2205	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0084	0.0000	1.9003	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5361	0.0000	0.5533	0.0000	3.1784	0.1107	4.9803	0.0000	0.0454	0.0000
0.5361		0.5533		3.2891		4.9803		0.0454	

P957		P961		P962		P964		P966	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9700	0.0000
0.7211	0.0000	0.3495	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.2462	0.0000	0.2387	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0523	0.0000	0.1223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2500	0.0000
0.0855	0.0000	0.0686	0.0000	0.0000	0.0000	0.0000	0.0000	1.7100	0.0000
0.4246	0.0000	0.1194	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0706	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0590	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.3464	0.0000	0.1093	2.6500	0.1431
0.8381	0.0000	0.0985	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	2.6452	0.0000	3.1700	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0134	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.2800	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.4383	0.0000	0.9970	0.0000	2.6452	0.3464	3.1834	0.1093	7.9190	0.1431
2.4383		0.9970		2.9916		3.2927		8.0622	

P967		P968		P972		P977		P978	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.9700	0.0000	0.9700	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4425	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1055	0.0000	0.1008	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0102	0.0000	0.0000	0.0000
1.2500	0.0000	1.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.7100	0.0000	1.7100	0.0000	0.2338	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0590	0.0000	0.0590	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2.6500	0.1431	2.6500	0.1431	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0458	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2800	0.0000	1.2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7.9190	0.1431	7.9190	0.1431	0.2338	0.0000	0.1157	0.0000	0.5891	0.0000
8.0622		8.0622		0.2338		0.1157		0.5891	

P980		P981	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.4024	0.0000
0.0000	0.0000	0.2394	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0947	0.0000
0.8834	0.0000	0.0000	0.0000
0.1598	0.0000	0.0692	0.0000
0.0000	0.0000	0.1249	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
2.6500	0.0000	0.0000	0.0000
0.0000	0.0000	0.0494	0.0000
0.0000	0.4465	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
1.2800	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000
4.9733	0.4465	0.9800	0.0000
5.4197		0.9800	

P983		P985		P987		P988	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.2644	0.0000	0.4002	0.0000	0.0000	0.0000	0.5741	0.0000
0.0000	0.0000	0.2381	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.1823	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1485	0.0000
0.0000	0.0000	0.9893	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0998	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0311	0.0000	0.0000	0.0000	0.0000	0.0000
0.2257	0.0000	0.0000	0.0000	3.1700	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2757	0.0000	1.6236	0.2328
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1.4901	0.0000	1.9409	0.0000	3.4457	0.0000	3.3461	0.2328
1.4901		1.9409		3.4457		3.5790	

P990		P991		P992		P1001	
Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)	Active Load (pu)	Reactive Load (pu)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.4328	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.2476	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0495	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7227	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.1093	0.0000	0.0000	0.0000	0.0000	2.6500	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1700	0.0000	3.1700	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0134	0.0000	0.5410	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0354	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3.1834	0.1093	3.7110	0.0000	0.7299	0.0000	3.4080	0.0000
3.2927		3.7110		0.7299		3.4080	

Annex 9

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State Position	Occurrences	Occurrence (%)	State Position	Occurrences	Occurrence (%)		p.u.	p.u.
P4	2357	41	0.001025	3451	21	0.000525	5175.00	0.104866	0.530987
P5	2533	35	0.000875	4327	14	0.000350	27261.02	7.217953	0.000000
P6	2538	35	0.000875	3985	16	0.000400	27261.02	7.217953	0.000000
P9	2846	29	0.000725	5071	11	0.000275	27261.02	7.217953	0.000000
P10	2963	27	0.000675	4292	14	0.000350	26796.02	7.703672	0.000000
P11	2965	27	0.000675	4119	15	0.000375	26796.02	7.768486	0.066125
P12	3038	27	0.000675	5889	10	0.000250	1937.16	0.000000	0.003501
P13	3127	25	0.000625	4000	16	0.000400	26796.02	7.703672	0.000000
P14	3129	25	0.000625	4128	15	0.000375	26796.02	7.771335	0.232256
P15	3219	25	0.000625	6318	9	0.000225	1937.16	0.000000	0.003501
P17	3506	22	0.000550	6867	8	0.000200	1937.16	0.000000	0.008874
P19	3871	19	0.000475	5898	10	0.000250	1937.16	0.000000	0.008874
P23	4177	16	0.000400	10710	3	0.000075	23556.02	5.875300	1.116335
P25	4624	14	0.000350	5748	9	0.000225	26556.02	6.923139	0.000000
P29	4864	13	0.000325	7406	6	0.000150	26556.02	6.923139	0.000000
P30	4915	13	0.000325	9848	4	0.000100	26556.02	7.013424	0.000000
P34	5478	11	0.000275	6902	7	0.000175	26556.02	7.013424	0.000000
P38	5984	10	0.000250	9409	5	0.000125	10548.01	0.555012	0.000000
P40	6037	9	0.000225	9318	4	0.000100	15918.01	4.703312	0.195088
P41	6079	9	0.000225	21384	1	0.000025	15693.01	1.828660	0.000000
P42	6246	9	0.000225	28939	1	0.000025	6675.00	0.106980	0.533908
P43	6314	9	0.000225	32182	1	0.000025	6675.00	0.106980	0.533908
P44	6411	9	0.000225	10988	4	0.000100	10548.01	0.571273	0.000000
P45	6412	9	0.000225	9454	5	0.000125	1530.00	2.623476	0.695469
P46	6497	8	0.000200	11008	3	0.000075	15918.01	4.679733	0.420027
P47	6938	8	0.000200	13733	3	0.000075	1530.00	2.623476	0.695469
P51	7148	7	0.000175	0	0	0.000000	28761.02	7.411881	0.000000
P52	7404	7	0.000175	0	0	0.000000	31680.02	7.898957	0.000000
P56	7618	7	0.000175	40955	1	0.000025	1457.16	0.000000	0.123157
P57	7736	6	0.000150	7320	6	0.000150	13284.00	4.259466	0.150264
P59	8260	6	0.000150	0	0	0.000000	28761.02	7.328216	0.000000
P60	8404	6	0.000150	0	0	0.000000	37168.29	6.272335	0.000000
P61	8469	6	0.000150	9453	5	0.000125	4530.00	0.149021	0.000000
P65	8615	5	0.000125	13803	2	0.000050	6660.00	2.716584	1.027858
P66	8710	5	0.000125	8285	5	0.000125	15693.01	1.812466	0.000000
P67	8938	5	0.000125	0	0	0.000000	30931.80	7.208763	0.000000
P68	9545	5	0.000125	38705	1	0.000025	23264.53	4.357290	0.000000
P72	9588	5	0.000125	19227	2	0.000050	1457.16	0.000000	0.142712
P73	9621	5	0.000125	18780	2	0.000050	21122.28	2.864822	0.478655
P77	9657	4	0.000100	0	0	0.000000	31440.02	9.309030	0.010931
P78	9850	4	0.000100	0	0	0.000000	28521.02	8.796064	0.402722
P79	10221	4	0.000100	14820	2	0.000050	28761.02	7.411881	0.000000
P80	10236	4	0.000100	11507	3	0.000075	28761.02	7.411881	0.000000
P81	10712	4	0.000100	0	0	0.000000	31680.02	8.003736	0.450664
P86	11180	4	0.000100	40755	1	0.000025	1755.00	2.884545	0.459485
P91	11185	4	0.000100	0	0	0.000000	6437.16	0.000000	0.008874
P92	11186	4	0.000100	40091	1	0.000025	3437.16	0.000000	0.064073
P93	11187	4	0.000100	40073	1	0.000025	3197.16	0.000000	0.003501
P99	11351	3	0.000075	0	0	0.000000	31980.02	9.679254	0.000000
P100	11355	3	0.000075	18934	1	0.000025	31980.02	9.765302	0.099082
P101	11456	3	0.000075	0	0	0.000000	26436.02	8.638701	0.000000
P102	11466	3	0.000075	19792	1	0.000025	28521.02	8.666728	0.000000
P103	11472	3	0.000075	0	0	0.000000	25281.02	6.824009	0.336246
P104	11494	3	0.000075	0	0	0.000000	29061.02	9.182728	0.000000
P105	11663	3	0.000075	21626	1	0.000025	9675.00	1.407775	0.000000
P106	11664	3	0.000075	0	0	0.000000	7245.00	0.104617	0.531847
P107	11665	3	0.000075	0	0	0.000000	6975.00	0.168612	0.483151
P108	11666	3	0.000075	21666	1	0.000025	6975.00	0.168612	0.483151
P109	11698	3	0.000075	0	0	0.000000	31231.80	8.874223	0.000000
P110	11765	3	0.000075	0	0	0.000000	31231.80	8.874223	0.000000
P112	11949	3	0.000075	22861	1	0.000025	28761.02	7.411881	0.000000
P113	11973	3	0.000075	23706	1	0.000025	6675.00	0.105420	0.537765
P114	12024	3	0.000075	0	0	0.000000	27486.02	6.846032	0.000000
P115	12196	3	0.000075	15215	2	0.000050	6675.00	0.105420	0.537765
P116	12563	3	0.000075	15464	2	0.000050	31680.02	7.898957	0.000000
P117	12650	3	0.000075	11853	3	0.000075	28761.02	7.328216	0.000000
P118	12679	3	0.000075	27956	1	0.000025	28761.02	7.328216	0.000000
P119	12926	3	0.000075	16238	2	0.000050	30931.80	7.208451	0.000000
P120	12978	3	0.000075	0	0	0.000000	31680.02	7.981699	0.134225
P121	13349	3	0.000075	0	0	0.000000	30931.80	7.208451	0.000000
P125	13605	3	0.000075	0	0	0.000000	33928.29	4.379414	0.476218
P126	13820	3	0.000075	0	0	0.000000	21066.02	4.614999	0.242795
P127	13821	3	0.000075	9429	5	0.000125	1290.00	7.056883	0.115336
P128	13822	3	0.000075	0	0	0.000000	3330.00	2.829131	0.540000
P133	13827	3	0.000075	18625	2	0.000050	12455.17	0.000000	0.015886
P134	13828	3	0.000075	19111	2	0.000050	1457.16	0.000000	0.123157
P135	13829	3	0.000075	40043	1	0.000025	6437.16	0.000000	0.003501
P136	13830	3	0.000075	39875	1	0.000025	12455.17	0.000000	0.010358
P137	13831	3	0.000075	0	0	0.000000	12455.17	0.000000	0.010358
P138	13832	3	0.000075	0	0	0.000000	12455.17	0.000000	0.010511
P139	13833	3	0.000075	0	0	0.000000	3437.16	0.000000	0.058332

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P242	19324	2	0.000050	0	0	0.000000	7937.16	0.000000	0.058478
P246	19481	2	0.000050	0	0	0.000000	12069.42	0.000000	0.108977
P248	19501	2	0.000050	0	0	0.000000	15104.27	2.245153	0.000000
P249	19502	2	0.000050	18843	2	0.000050	12404.27	0.786903	0.000000
P250	19503	2	0.000050	0	0	0.000000	12404.27	0.786903	0.000000
P259	19512	2	0.000050	0	0	0.000000	3311.26	2.645184	0.346379
P260	19513	2	0.000050	0	0	0.000000	3311.26	2.645184	0.346379
P264	19517	2	0.000050	0	0	0.000000	3311.26	2.645184	0.346379
P265	19625	1	0.000025	0	0	0.000000	27246.02	8.184258	0.000000
P266	19627	1	0.000025	0	0	0.000000	27246.02	8.184258	0.000000
P267	19629	1	0.000025	0	0	0.000000	26436.02	7.169563	0.000000
P268	19668	1	0.000025	0	0	0.000000	24816.02	7.371076	0.085040
P269	19669	1	0.000025	0	0	0.000000	27246.02	8.266380	0.030280
P270	19670	1	0.000025	0	0	0.000000	24006.02	6.318875	0.088312
P271	19671	1	0.000025	0	0	0.000000	24006.02	6.318875	0.088312
P272	19673	1	0.000025	0	0	0.000000	24006.02	6.318875	0.088312
P273	19711	1	0.000025	0	0	0.000000	31440.02	9.312202	0.176447
P274	19712	1	0.000025	0	0	0.000000	27246.02	8.285591	0.365915
P275	19713	1	0.000025	0	0	0.000000	24006.02	6.358640	0.707904
P276	19734	1	0.000025	0	0	0.000000	31440.02	9.315133	0.717834
P277	19735	1	0.000025	18512	1	0.000025	24816.02	7.381755	0.899925
P278	19770	1	0.000025	0	0	0.000000	28866.02	7.902790	0.180837
P279	19778	1	0.000025	0	0	0.000000	28866.02	7.922740	0.505317
P280	19779	1	0.000025	0	0	0.000000	29640.16	8.404884	0.401428
P281	19813	1	0.000025	0	0	0.000000	29190.16	7.837350	0.000000
P282	19814	1	0.000025	0	0	0.000000	29190.16	7.837350	0.000000
P283	19847	1	0.000025	0	0	0.000000	28866.02	7.922740	0.505317
P284	19891	1	0.000025	0	0	0.000000	29190.16	7.837350	0.000000
P285	19910	1	0.000025	0	0	0.000000	28866.02	7.902790	0.180837
P286	19927	1	0.000025	0	0	0.000000	25950.16	6.013084	1.308471
P287	19987	1	0.000025	0	0	0.000000	28380.16	6.772041	0.000000
P288	20011	1	0.000025	0	0	0.000000	28866.02	7.922740	0.505317
P289	20015	1	0.000025	0	0	0.000000	25950.16	6.013084	1.308471
P290	20118	1	0.000025	18928	1	0.000025	28866.02	7.922740	0.505317
P291	20120	1	0.000025	0	0	0.000000	30181.31	5.418996	0.522541
P292	20220	1	0.000025	0	0	0.000000	31980.02	9.679254	0.000000
P293	20251	1	0.000025	0	0	0.000000	31980.02	9.787872	0.433931
P294	20258	1	0.000025	0	0	0.000000	25356.02	7.865877	1.134483
P295	20415	1	0.000025	0	0	0.000000	31980.02	9.679254	0.000000
P296	20450	1	0.000025	0	0	0.000000	33240.02	11.272625	0.065904
P297	20612	1	0.000025	0	0	0.000000	33780.02	11.652750	0.000000
P298	20685	1	0.000025	0	0	0.000000	31980.02	9.679254	0.000000
P299	20707	1	0.000025	19359	1	0.000025	31980.02	9.765302	0.099082
P300	20726	1	0.000025	0	0	0.000000	31980.02	9.787872	0.433931
P301	20731	1	0.000025	0	0	0.000000	25356.02	7.865877	1.134483
P303	21010	1	0.000025	0	0	0.000000	23802.01	8.094221	0.036944
P304	21011	1	0.000025	0	0	0.000000	17178.01	6.191200	0.031789
P305	21012	1	0.000025	0	0	0.000000	16368.01	5.149065	0.473020
P306	21013	1	0.000025	0	0	0.000000	29463.38	10.962353	0.900000
P307	21014	1	0.000025	0	0	0.000000	17178.01	6.231711	0.147751
P308	21016	1	0.000025	0	0	0.000000	22282.25	3.859111	0.324271
P309	21017	1	0.000025	0	0	0.000000	17178.01	6.217509	0.117100
P311	21020	1	0.000025	0	0	0.000000	25169.14	4.818424	0.326203
P312	21060	1	0.000025	0	0	0.000000	28521.02	8.666728	0.000000
P313	21066	1	0.000025	0	0	0.000000	28971.02	9.151027	0.000000
P314	21083	1	0.000025	0	0	0.000000	25281.02	6.815908	0.165612
P315	21097	1	0.000025	0	0	0.000000	28971.02	9.230557	0.072865
P316	21203	1	0.000025	0	0	0.000000	29655.16	7.254903	0.000000
P317	21238	1	0.000025	19924	1	0.000025	29061.02	9.182728	0.000000
P318	21245	1	0.000025	0	0	0.000000	33705.02	10.663817	0.000000
P319	21297	1	0.000025	0	0	0.000000	29511.02	9.560745	0.000000
P320	21369	1	0.000025	0	0	0.000000	33705.02	10.641970	0.000000
P321	21381	1	0.000025	0	0	0.000000	27531.02	9.244230	0.107052
P322	21434	1	0.000025	0	0	0.000000	24825.87	5.785721	0.324875
P323	21471	1	0.000025	0	0	0.000000	28521.02	8.666728	0.000000
P324	21472	1	0.000025	0	0	0.000000	25281.02	6.739362	0.000000
P325	21473	1	0.000025	0	0	0.000000	27711.02	7.614536	0.000000
P326	21474	1	0.000025	0	0	0.000000	28971.02	9.151027	0.000000
P327	21476	1	0.000025	0	0	0.000000	33054.94	7.294194	0.000000
P328	21487	1	0.000025	20233	1	0.000025	28521.02	8.792065	0.085404
P329	21488	1	0.000025	0	0	0.000000	25281.02	6.815908	0.165612
P330	21489	1	0.000025	0	0	0.000000	24471.02	5.824214	0.327099
P331	21499	1	0.000025	0	0	0.000000	24471.02	5.809104	0.378783
P332	21531	1	0.000025	0	0	0.000000	29655.16	7.254903	0.000000
P333	21649	1	0.000025	20272	1	0.000025	29061.02	9.182728	0.000000
P334	21702	1	0.000025	0	0	0.000000	29511.02	9.560745	0.000000
P335	21770	1	0.000025	0	0	0.000000	29061.02	9.182728	0.000000
P336	21840	1	0.000025	0	0	0.000000	33265.26	7.138684	0.343240
P337	21841	1	0.000025	20684	1	0.000025	8385.00	3.354206	0.540000
P338	21861	1	0.000025	0	0	0.000000	28986.02	8.211021	0.000000
P339	21862	1	0.000025	0	0	0.000000	25746.02	6.217760	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P421	24874	1	0.000025	0	0	0.000000	30931.80	7.208763	0.000000
P422	24979	1	0.000025	0	0	0.000000	29416.80	6.174618	0.000000
P423	25046	1	0.000025	14674	2	0.000050	27486.02	6.846032	0.000000
P424	25049	1	0.000025	0	0	0.000000	27486.02	6.846032	0.000000
P425	25076	1	0.000025	0	0	0.000000	26316.02	7.587687	0.189144
P426	25103	1	0.000025	0	0	0.000000	28746.02	8.454344	0.102408
P427	25135	1	0.000025	0	0	0.000000	30690.16	8.122696	0.489787
P428	25281	1	0.000025	0	0	0.000000	30690.16	8.021152	0.000000
P429	25425	1	0.000025	0	0	0.000000	29286.02	8.792869	0.000000
P430	25657	1	0.000025	0	0	0.000000	8160.00	2.561193	0.471714
P431	25658	1	0.000025	0	0	0.000000	16044.00	5.985897	0.000901
P433	25660	1	0.000025	0	0	0.000000	9420.00	4.068702	0.424263
P434	25661	1	0.000025	0	0	0.000000	8160.00	2.566527	0.769272
P436	25697	1	0.000025	0	0	0.000000	30021.02	8.993900	0.395663
P437	25755	1	0.000025	0	0	0.000000	30561.02	9.377619	0.000000
P438	25810	1	0.000025	0	0	0.000000	9885.00	12.156970	0.900000
P439	25953	1	0.000025	0	0	0.000000	27246.02	6.523352	0.478149
P440	25992	1	0.000025	0	0	0.000000	26781.02	7.010808	0.160406
P441	25997	1	0.000025	0	0	0.000000	25971.02	6.036671	0.683148
P442	26015	1	0.000025	0	0	0.000000	31155.16	7.449984	0.000000
P443	26023	1	0.000025	0	0	0.000000	31155.16	7.449984	0.000000
P444	26142	1	0.000025	0	0	0.000000	27246.02	6.412721	0.000000
P445	26163	1	0.000025	0	0	0.000000	16702.44	0.105142	0.538141
P446	26164	1	0.000025	0	0	0.000000	17193.01	2.016236	0.000000
P447	26165	1	0.000025	0	0	0.000000	25077.01	5.359724	0.000000
P448	26166	1	0.000025	0	0	0.000000	13857.86	0.118134	0.524857
P449	26241	1	0.000025	0	0	0.000000	33991.80	10.631390	0.000000
P450	26271	1	0.000025	0	0	0.000000	29416.80	6.308840	0.390339
P451	26326	1	0.000025	24556	1	0.000025	30931.80	7.208763	0.000000
P452	26456	1	0.000025	0	0	0.000000	34827.58	7.980731	0.000000
P453	26458	1	0.000025	0	0	0.000000	32847.58	7.563598	0.325218
P454	26740	1	0.000025	0	0	0.000000	30261.02	7.606892	0.000000
P455	26747	1	0.000025	0	0	0.000000	28281.02	7.286637	1.096187
P457	26836	1	0.000025	0	0	0.000000	32431.80	7.319520	0.000000
P458	26936	1	0.000025	0	0	0.000000	30691.80	8.457416	0.000000
P459	26937	1	0.000025	0	0	0.000000	31591.80	9.422754	0.000000
P460	26939	1	0.000025	0	0	0.000000	25026.02	7.087377	0.000000
P461	26959	1	0.000025	0	0	0.000000	27816.02	8.543062	0.116872
P462	26960	1	0.000025	0	0	0.000000	24576.02	6.586066	0.174217
P463	26970	1	0.000025	0	0	0.000000	24576.02	6.590767	0.348637
P464	26985	1	0.000025	0	0	0.000000	31825.94	7.146561	0.000000
P465	27053	1	0.000025	0	0	0.000000	32240.08	6.830546	0.447106
P466	27203	1	0.000025	0	0	0.000000	16938.01	5.461308	0.239328
P467	27216	1	0.000025	0	0	0.000000	27916.80	6.104656	0.400248
P468	27218	1	0.000025	0	0	0.000000	36500.72	7.568795	0.321683
P469	27284	1	0.000025	0	0	0.000000	33550.94	8.106414	0.000000
P470	27338	1	0.000025	0	0	0.000000	28281.02	7.974352	0.000000
P471	27342	1	0.000025	0	0	0.000000	27916.80	6.104656	0.400248
P472	27394	1	0.000025	0	0	0.000000	18359.50	2.116978	0.000000
P473	27405	1	0.000025	0	0	0.000000	30087.58	5.885186	0.428597
P474	27661	1	0.000025	0	0	0.000000	31587.58	5.979671	0.000000
P475	27760	1	0.000025	0	0	0.000000	32731.80	9.071231	0.000000
P476	27816	1	0.000025	0	0	0.000000	32656.80	8.171190	0.000000
P477	27840	1	0.000025	0	0	0.000000	37221.72	8.112297	0.000000
P478	27934	1	0.000025	0	0	0.000000	27816.02	8.543062	0.116872
P479	28048	1	0.000025	0	0	0.000000	31231.80	8.873598	0.000000
P480	28081	1	0.000025	26307	1	0.000025	31231.80	8.873598	0.000000
P481	28192	1	0.000025	0	0	0.000000	33031.80	10.943797	0.000000
P482	28210	1	0.000025	0	0	0.000000	28281.02	7.974352	0.000000
P483	28260	1	0.000025	0	0	0.000000	44221.85	8.005431	0.338408
P484	28344	1	0.000025	0	0	0.000000	27916.80	6.125154	0.845593
P486	28418	1	0.000025	0	0	0.000000	30087.58	5.885186	0.428597
P487	28500	1	0.000025	0	0	0.000000	31887.58	7.877082	0.363738
P488	28556	1	0.000025	0	0	0.000000	32191.80	8.768499	0.436950
P489	28726	1	0.000025	26922	1	0.000025	30931.80	7.208093	0.000000
P490	28831	1	0.000025	0	0	0.000000	32656.80	8.171190	0.000000
P491	28851	1	0.000025	0	0	0.000000	29416.80	6.173885	0.000000
P492	28995	1	0.000025	0	0	0.000000	35052.58	8.744223	0.000000
P493	29011	1	0.000025	0	0	0.000000	34827.58	7.890992	0.000000
P495	29133	1	0.000025	0	0	0.000000	32940.02	9.510264	0.168200
P496	29142	1	0.000025	0	0	0.000000	25056.02	6.091316	1.229154
P497	29221	1	0.000025	0	0	0.000000	29880.16	7.029003	0.000000
P498	29307	1	0.000025	0	0	0.000000	30690.16	8.032502	0.000000
P499	29314	1	0.000025	0	0	0.000000	27450.16	6.149472	0.245956
P500	29382	1	0.000025	0	0	0.000000	33480.02	9.966702	0.563731
P501	29466	1	0.000025	27115	1	0.000025	33480.02	9.874474	0.000000
P502	29584	1	0.000025	0	0	0.000000	33480.02	9.966702	0.563731
P503	29660	1	0.000025	0	0	0.000000	15341.13	3.030329	0.852260
P504	29678	1	0.000025	0	0	0.000000	30021.02	8.861954	0.000000
P505	29679	1	0.000025	0	0	0.000000	30021.02	8.861954	0.000000
P506	29681	1	0.000025	0	0	0.000000	29211.02	7.809705	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P615	38160	1	0.000025	0	0	0.000000	22905.84	4.826768	0.030083
P616	38218	1	0.000025	0	0	0.000000	33118.29	3.404061	0.280180
P617	38219	1	0.000025	0	0	0.000000	33118.29	3.404061	0.280180
P618	38232	1	0.000025	0	0	0.000000	33928.29	4.438970	0.987456
P619	38289	1	0.000025	0	0	0.000000	35728.29	6.232651	0.000000
P620	38341	1	0.000025	0	0	0.000000	34393.29	3.909133	0.328364
P621	38369	1	0.000025	0	0	0.000000	34393.29	3.909133	0.328364
P623	38525	1	0.000025	0	0	0.000000	35893.29	4.110268	0.315244
P624	38560	1	0.000025	36378	1	0.000025	34948.29	5.147384	0.457745
P625	38581	1	0.000025	0	0	0.000000	38188.29	6.960321	0.000000
P626	38629	1	0.000025	0	0	0.000000	55953.05	6.057717	0.332915
P627	38721	1	0.000025	0	0	0.000000	35893.29	4.110231	0.315797
P628	39001	1	0.000025	0	0	0.000000	32452.11	3.863311	1.290000
P633	39491	1	0.000025	0	0	0.000000	26489.53	3.950593	0.136031
P634	39492	1	0.000025	0	0	0.000000	35714.53	1.443134	0.000000
P636	39494	1	0.000025	0	0	0.000000	26564.53	5.351738	0.026349
P637	39518	1	0.000025	0	0	0.000000	33928.29	4.347676	0.724106
P638	39523	1	0.000025	0	0	0.000000	35998.29	4.524001	0.833503
P639	39543	1	0.000025	0	0	0.000000	35998.29	4.408829	0.000000
P640	39567	1	0.000025	0	0	0.000000	38968.29	8.281605	0.249311
P642	39635	1	0.000025	0	0	0.000000	38893.29	7.285108	0.168987
P643	39686	1	0.000025	0	0	0.000000	35428.29	4.601590	0.545323
P644	39757	1	0.000025	0	0	0.000000	37498.29	4.664829	0.760013
P645	39816	1	0.000025	0	0	0.000000	34948.29	5.159134	0.513298
P646	39818	1	0.000025	0	0	0.000000	34948.29	5.101609	0.656537
P647	39887	1	0.000025	0	0	0.000000	37498.29	4.602922	0.000000
P648	39997	1	0.000025	0	0	0.000000	37228.29	6.400205	0.000000
P649	40012	1	0.000025	0	0	0.000000	35893.29	3.973536	0.000000
P651	40097	1	0.000025	0	0	0.000000	48758.33	3.901251	1.070733
P652	40120	1	0.000025	0	0	0.000000	72299.03	4.978629	0.000000
P655	40813	1	0.000025	0	0	0.000000	5002.50	0.000000	0.436443
P658	40885	1	0.000025	0	0	0.000000	3502.50	0.011297	0.000000
P665	40954	1	0.000025	0	0	0.000000	11808.01	2.021514	0.000000
P667	40956	1	0.000025	0	0	0.000000	11808.01	2.041719	0.000000
P668	40957	1	0.000025	0	0	0.000000	12258.01	2.532235	0.000000
P669	40958	1	0.000025	0	0	0.000000	17197.84	2.527073	0.000000
P670	40959	1	0.000025	0	0	0.000000	13068.01	3.535886	0.000000
P671	40960	1	0.000025	0	0	0.000000	6600.00	0.255215	0.000000
P673	40962	1	0.000025	0	0	0.000000	7860.00	1.709327	0.000000
P674	40963	1	0.000025	0	0	0.000000	12348.01	2.445791	0.000000
P675	40964	1	0.000025	0	0	0.000000	12348.01	2.458896	0.000000
P676	40965	1	0.000025	0	0	0.000000	3090.00	0.211995	0.000000
P677	40966	1	0.000025	0	0	0.000000	17992.25	0.649224	0.121423
P679	40968	1	0.000025	40919	1	0.000025	1755.00	2.884545	0.459485
P680	40969	1	0.000025	39918	1	0.000025	12273.01	0.571273	0.000000
P681	40970	1	0.000025	0	0	0.000000	16773.01	3.912850	0.000000
P684	40973	1	0.000025	0	0	0.000000	16068.01	4.658643	0.000000
P686	40975	1	0.000025	0	0	0.000000	6030.00	0.332382	0.000000
P687	40976	1	0.000025	0	0	0.000000	12048.01	0.759373	0.000000
P689	40978	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P690	40979	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P691	40980	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P692	40981	1	0.000025	0	0	0.000000	9900.00	2.325641	0.000000
P695	40984	1	0.000025	0	0	0.000000	12048.01	0.759373	0.000000
P698	40987	1	0.000025	0	0	0.000000	4980.00	0.250000	0.000000
P699	40988	1	0.000025	0	0	0.000000	13068.01	1.496553	0.000000
P701	40990	1	0.000025	0	0	0.000000	4755.00	3.211360	0.164510
P704	40993	1	0.000025	0	0	0.000000	13293.01	1.299991	0.000000
P706	40995	1	0.000025	0	0	0.000000	22566.02	4.817176	0.215250
P707	40996	1	0.000025	0	0	0.000000	24960.16	4.964056	0.335772
P709	40998	1	0.000025	0	0	0.000000	30649.06	4.262974	0.000000
P716	41005	1	0.000025	0	0	0.000000	13308.01	2.254180	0.000000
P728	41017	1	0.000025	0	0	0.000000	12215.17	0.332333	0.000000
P729	41018	1	0.000025	39804	1	0.000025	12215.17	0.332333	0.000000
P730	41019	1	0.000025	0	0	0.000000	15455.17	2.183868	0.000000
P731	41020	1	0.000025	0	0	0.000000	21473.18	2.744126	0.000000
P734	41023	1	0.000025	0	0	0.000000	2147.16	4.495637	0.771122
P735	41024	1	0.000025	0	0	0.000000	12215.17	0.375048	0.000000
P742	41031	1	0.000025	39960	1	0.000025	12755.17	0.729693	0.000000
P746	41035	1	0.000025	0	0	0.000000	3497.16	4.305446	0.587486
P747	41036	1	0.000025	0	0	0.000000	14555.17	2.676532	0.000000
P750	41039	1	0.000025	39988	1	0.000025	4037.16	0.161799	0.000000
P751	41040	1	0.000025	0	0	0.000000	5297.16	0.412283	0.102742
P754	41043	1	0.000025	0	0	0.000000	14390.17	1.779857	0.000000
P756	41045	1	0.000025	0	0	0.000000	3422.16	3.551833	0.385760
P759	41048	1	0.000025	0	0	0.000000	13940.17	1.256066	0.000000
P764	41053	1	0.000025	0	0	0.000000	23198.18	3.771274	0.156960
P767	41056	1	0.000025	0	0	0.000000	14480.17	1.684606	0.000000
P769	41058	1	0.000025	0	0	0.000000	18624.99	0.000000	0.156327
P770	41059	1	0.000025	0	0	0.000000	15575.17	3.418487	0.000000
P771	41060	1	0.000025	0	0	0.000000	10817.16	4.474217	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P853	41142	1	0.000025	0	0	0.000000	7937.16	0.000000	0.058478
P854	41143	1	0.000025	0	0	0.000000	5162.16	0.000000	0.065809
P855	41144	1	0.000025	0	0	0.000000	17358.20	0.000000	0.058498
P856	41145	1	0.000025	0	0	0.000000	16025.17	0.000000	0.063367
P857	41146	1	0.000025	0	0	0.000000	39360.37	0.000000	0.065225
P858	41147	1	0.000025	0	0	0.000000	4217.16	0.000000	0.193348
P859	41148	1	0.000025	0	0	0.000000	4757.16	0.000000	0.181971
P860	41149	1	0.000025	0	0	0.000000	7937.16	0.000000	0.053146
P861	41150	1	0.000025	0	0	0.000000	13955.17	0.000000	0.059358
P862	41151	1	0.000025	0	0	0.000000	9437.16	0.000000	0.111123
P863	41152	1	0.000025	0	0	0.000000	506.97	0.000000	0.206798
P868	41938	1	0.000025	0	0	0.000000	11782.28	1.540107	0.000000
P872	41956	1	0.000025	0	0	0.000000	26009.53	3.070958	0.000000
P873	41963	1	0.000025	0	0	0.000000	26264.53	1.144152	0.341409
P880	42059	1	0.000025	0	0	0.000000	11864.27	0.343615	0.000000
P882	42061	1	0.000025	41197	1	0.000025	15104.27	2.262871	0.000000
P884	42063	1	0.000025	0	0	0.000000	11864.27	0.379598	0.000000
P885	42064	1	0.000025	0	0	0.000000	11864.27	0.396454	0.000000
P888	42067	1	0.000025	41035	1	0.000025	11864.27	0.383889	0.000000
P889	42068	1	0.000025	41007	1	0.000025	11864.27	0.397407	0.000000
P893	42072	1	0.000025	41089	1	0.000025	12674.27	5.201031	0.000000
P899	42078	1	0.000025	41076	1	0.000025	12674.27	5.201031	0.000000
P901	42080	1	0.000025	0	0	0.000000	3146.26	7.518218	0.348688
P902	42081	1	0.000025	0	0	0.000000	3596.26	5.527149	0.540000
P903	42082	1	0.000025	41393	1	0.000025	6386.26	0.364266	0.000000
P906	42085	1	0.000025	0	0	0.000000	16904.27	4.214630	0.000000
P907	42086	1	0.000025	0	0	0.000000	3146.26	3.977149	0.540000
P908	42087	1	0.000025	0	0	0.000000	14474.27	0.904639	0.000000
P909	42088	1	0.000025	0	0	0.000000	6386.26	0.364266	0.000000
P910	42089	1	0.000025	0	0	0.000000	2336.26	4.186988	0.296093
P911	42090	1	0.000025	0	0	0.000000	12404.27	0.786903	0.000000
P912	42091	1	0.000025	0	0	0.000000	14474.27	0.921474	0.000000
P917	42096	1	0.000025	0	0	0.000000	3611.26	3.970970	0.540000
P918	42097	1	0.000025	0	0	0.000000	3611.26	3.970970	0.540000
P926	42105	1	0.000025	0	0	0.000000	16124.27	3.000474	0.000000
P927	42106	1	0.000025	0	0	0.000000	4091.26	4.533967	0.363604
P928	42107	1	0.000025	0	0	0.000000	2846.26	3.157299	0.037884
P931	42110	1	0.000025	0	0	0.000000	13364.27	0.536072	0.000000
P932	42111	1	0.000025	0	0	0.000000	13364.27	0.553294	0.000000
P933	42112	1	0.000025	0	0	0.000000	2846.26	3.178353	0.110749
P947	42126	1	0.000025	0	0	0.000000	24422.28	4.980253	0.000000
P948	42127	1	0.000025	0	0	0.000000	13829.27	0.045370	0.000000
P957	42136	1	0.000025	0	0	0.000000	16604.27	2.438310	0.000000
P961	42140	1	0.000025	0	0	0.000000	13904.27	0.996968	0.000000
P962	42141	1	0.000025	0	0	0.000000	3311.26	2.645184	0.346379
P964	42143	1	0.000025	19065	2	0.000050	3086.26	3.183355	0.109339
P966	42145	1	0.000025	0	0	0.000000	4886.26	7.919028	0.143139
P967	42146	1	0.000025	0	0	0.000000	4886.26	7.919028	0.143139
P968	42147	1	0.000025	0	0	0.000000	4886.26	7.919028	0.143139
P972	42151	1	0.000025	0	0	0.000000	15329.27	0.233774	0.000000
P977	42156	1	0.000025	0	0	0.000000	7346.26	0.115689	0.000000
P978	42157	1	0.000025	0	0	0.000000	13364.27	0.589077	0.000000
P980	42159	1	0.000025	0	0	0.000000	7310.40	4.973262	0.446458
P981	42160	1	0.000025	0	0	0.000000	13904.27	0.979952	0.000000
P983	42162	1	0.000025	0	0	0.000000	4646.26	1.490082	0.000000
P985	42164	1	0.000025	0	0	0.000000	20417.99	1.940893	0.000000
P987	42166	1	0.000025	0	0	0.000000	26979.23	3.445669	0.000000
P988	42167	1	0.000025	0	0	0.000000	24122.28	3.346123	0.232844
P990	42169	1	0.000025	40957	1	0.000025	3086.26	3.183355	0.109339
P991	42170	1	0.000025	0	0	0.000000	4346.26	3.711048	0.000000
P992	42171	1	0.000025	0	0	0.000000	14864.27	0.729861	0.000000
P1001	42180	1	0.000025	0	0	0.000000	22236.54	3.408040	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	tate Positio	Occurrences	Occurrence (%)	State Position	Occurrences	Occurrence (%)		p.u.	p.u.
P140	13834	3	0.000075	18892	2	0.000050	3437.16	0.000000	0.052997
P146	13910	3	0.000075	41230	1	0.000025	3086.26	3.183355	0.109339
P147	13911	3	0.000075	0	0	0.000000	3086.26	3.183355	0.109339
P148	13958	2	0.000050	0	0	0.000000	31440.02	9.249163	0.000000
P149	13998	2	0.000050	0	0	0.000000	31440.02	9.312202	0.176447
P150	14251	2	0.000050	0	0	0.000000	31980.02	9.679254	0.000000
P151	14259	2	0.000050	0	0	0.000000	31980.02	9.765302	0.099082
P152	14269	2	0.000050	18971	1	0.000025	31980.02	9.787872	0.433931
P153	14335	2	0.000050	19295	1	0.000025	31980.02	9.679254	0.000000
P155	14456	2	0.000050	0	0	0.000000	28521.02	8.792065	0.085404
P157	14569	2	0.000050	0	0	0.000000	28521.02	8.666728	0.000000
P158	14760	2	0.000050	0	0	0.000000	29655.16	7.254903	0.000000
P159	14767	2	0.000050	0	0	0.000000	29061.02	9.182728	0.000000
P160	14803	2	0.000050	0	0	0.000000	29061.02	9.182728	0.000000
P161	14870	2	0.000050	21597	1	0.000025	6435.00	0.122193	0.515387
P162	14871	2	0.000050	0	0	0.000000	6435.00	0.121595	0.528714
P163	14872	2	0.000050	0	0	0.000000	7245.00	0.104617	0.531847
P164	14873	2	0.000050	21655	1	0.000025	6975.00	0.168612	0.483151
P165	14900	2	0.000050	0	0	0.000000	27451.80	6.591476	0.350415
P166	14978	2	0.000050	21972	1	0.000025	6420.00	2.551203	0.734550
P167	15049	2	0.000050	21573	1	0.000025	30691.80	8.457936	0.000000
P168	15112	2	0.000050	14544	2	0.000050	6420.00	2.551203	0.734550
P169	15182	2	0.000050	8223	5	0.000125	31680.02	7.898880	0.000000
P170	15183	2	0.000050	11034	3	0.000075	31680.02	7.898880	0.000000
P171	15189	2	0.000050	0	0	0.000000	31680.02	7.981832	0.133854
P172	15208	2	0.000050	0	0	0.000000	25056.02	6.091396	1.228630
P173	15413	2	0.000050	0	0	0.000000	28761.02	7.411881	0.000000
P174	15419	2	0.000050	0	0	0.000000	30021.02	8.993900	0.395663
P175	15620	2	0.000050	0	0	0.000000	31680.02	7.898880	0.000000
P176	15621	2	0.000050	23485	1	0.000025	31680.02	7.898880	0.000000
P177	15631	2	0.000050	14574	2	0.000050	31680.02	7.981832	0.133854
P178	15641	2	0.000050	0	0	0.000000	31680.02	7.969190	0.221632
P179	15735	2	0.000050	0	0	0.000000	33480.02	9.976605	0.441867
P182	15810	2	0.000050	23886	1	0.000025	28761.02	7.411881	0.000000
P183	16165	2	0.000050	0	0	0.000000	27816.02	8.562694	0.461366
P184	16166	2	0.000050	0	0	0.000000	24576.02	6.590767	0.348637
P185	16230	2	0.000050	25395	1	0.000025	27916.80	6.125154	0.845593
P186	16303	2	0.000050	25861	1	0.000025	30931.80	7.208093	0.000000
P187	16346	2	0.000050	15324	2	0.000050	30931.80	7.208093	0.000000
P188	16406	2	0.000050	0	0	0.000000	24576.02	6.586066	0.174217
P189	16671	2	0.000050	0	0	0.000000	31680.02	7.898957	0.000000
P191	16682	2	0.000050	0	0	0.000000	31680.02	7.981699	0.134225
P192	16692	2	0.000050	0	0	0.000000	31680.02	8.003736	0.450664
P193	16840	2	0.000050	0	0	0.000000	14784.00	4.456827	0.139847
P194	16841	2	0.000050	0	0	0.000000	17418.01	4.882825	0.191119
P195	16842	2	0.000050	0	0	0.000000	17418.01	4.899857	0.192143
P196	16855	2	0.000050	0	0	0.000000	30021.02	8.976537	0.087333
P197	16935	2	0.000050	28221	1	0.000025	28761.02	7.328216	0.000000
P198	17083	2	0.000050	0	0	0.000000	33180.02	8.103383	0.000000
P199	17088	2	0.000050	0	0	0.000000	33180.02	8.181092	0.127558
P202	17473	2	0.000050	30469	1	0.000025	25056.02	6.091316	1.229154
P203	17477	2	0.000050	0	0	0.000000	27450.16	6.149472	0.245956
P204	17553	2	0.000050	0	0	0.000000	33480.02	9.966702	0.563731
P205	17582	2	0.000050	0	0	0.000000	33480.02	9.964548	0.092462
P206	17609	2	0.000050	30786	1	0.000025	28761.02	7.328216	0.000000
P207	17696	2	0.000050	0	0	0.000000	28761.02	7.328216	0.000000
P208	17836	2	0.000050	0	0	0.000000	32370.02	7.041844	0.000000
P209	17923	2	0.000050	0	0	0.000000	8175.00	0.124499	0.520228
P210	18467	2	0.000050	0	0	0.000000	21077.27	2.851848	0.349749
P212	18703	2	0.000050	36438	1	0.000025	21105.84	2.831496	0.137647
P213	18805	2	0.000050	0	0	0.000000	38668.29	6.466665	0.000000
P214	19003	2	0.000050	0	0	0.000000	33782.54	3.133631	0.000000
P215	19011	2	0.000050	0	0	0.000000	37168.29	6.187577	0.000000
P220	19302	2	0.000050	40632	1	0.000025	1755.00	2.884545	0.459485
P221	19303	2	0.000050	0	0	0.000000	12048.01	0.742986	0.000000
P225	19307	2	0.000050	0	0	0.000000	15455.17	2.165265	0.000000
P227	19309	2	0.000050	18729	2	0.000050	12755.17	0.729693	0.000000
P228	19310	2	0.000050	0	0	0.000000	12755.17	0.745844	0.000000
P229	19311	2	0.000050	19034	2	0.000050	1457.16	0.000000	0.142712
P230	19312	2	0.000050	0	0	0.000000	6437.16	0.000000	0.008874
P231	19313	2	0.000050	0	0	0.000000	12455.17	0.000000	0.015731
P232	19314	2	0.000050	0	0	0.000000	3662.16	0.000000	0.015767
P233	19315	2	0.000050	0	0	0.000000	12455.17	0.000000	0.015731
P234	19316	2	0.000050	0	0	0.000000	4007.16	0.000000	0.009754
P235	19317	2	0.000050	40285	1	0.000025	3737.16	0.000000	0.015561
P236	19318	2	0.000050	0	0	0.000000	3662.16	0.000000	0.015767
P237	19319	2	0.000050	0	0	0.000000	7937.16	0.000000	0.064219
P238	19320	2	0.000050	39817	1	0.000025	12455.17	0.000000	0.010511
P239	19321	2	0.000050	39819	1	0.000025	3437.16	0.000000	0.058332
P240	19322	2	0.000050	0	0	0.000000	14255.17	0.934808	0.000000
P241	19323	2	0.00005	0	0	0.000000	14180.17	0.087471	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P340	21875	1	0.000025	0	0	0.000000	25746.02	6.433282	0.707606
P341	21971	1	0.000025	0	0	0.000000	28521.02	8.666728	0.000000
P342	21972	1	0.000025	20546	1	0.000025	28521.02	8.666728	0.000000
P343	21973	1	0.000025	0	0	0.000000	28971.02	9.151027	0.000000
P344	22010	1	0.000025	0	0	0.000000	25281.02	6.885256	1.133144
P345	22060	1	0.000025	0	0	0.000000	30915.16	8.799704	0.000000
P346	22125	1	0.000025	0	0	0.000000	36133.22	5.577105	0.526181
P347	22202	1	0.000025	0	0	0.000000	29511.02	9.560745	0.000000
P348	22213	1	0.000025	0	0	0.000000	26271.02	7.815690	0.628278
P349	22340	1	0.000025	0	0	0.000000	17643.01	5.670830	0.293701
P350	22341	1	0.000025	0	0	0.000000	24825.87	5.770143	0.403896
P351	22349	1	0.000025	0	0	0.000000	25746.02	6.217760	0.000000
P352	22359	1	0.000025	0	0	0.000000	34399.45	10.291287	0.132509
P353	22423	1	0.000025	0	0	0.000000	34170.02	10.070734	0.000000
P354	22424	1	0.000025	0	0	0.000000	31236.02	10.552140	0.000000
P355	22454	1	0.000025	0	0	0.000000	28986.02	8.211021	0.000000
P356	22455	1	0.000025	0	0	0.000000	29436.02	8.606004	0.000000
P357	22459	1	0.000025	0	0	0.000000	25746.02	6.379186	0.385380
P358	22520	1	0.000025	0	0	0.000000	5625.00	0.104713	0.531259
P359	22521	1	0.000025	21677	1	0.000025	6435.00	0.119202	0.528172
P360	22522	1	0.000025	0	0	0.000000	21741.73	3.301222	0.000000
P361	22523	1	0.000025	0	0	0.000000	21741.73	3.315853	0.000000
P362	22524	1	0.000025	0	0	0.000000	7245.00	0.104617	0.531847
P363	22525	1	0.000025	0	0	0.000000	13617.86	0.123139	0.517289
P364	22526	1	0.000025	0	0	0.000000	16857.86	1.513766	0.000000
P365	22527	1	0.000025	0	0	0.000000	17493.01	6.777297	0.000000
P366	22528	1	0.000025	0	0	0.000000	14157.86	0.264752	0.391319
P367	22529	1	0.000025	0	0	0.000000	14157.86	0.264752	0.391319
P368	22563	1	0.000025	0	0	0.000000	30691.80	8.457936	0.000000
P369	22578	1	0.000025	0	0	0.000000	23766.02	5.592303	0.355930
P370	22593	1	0.000025	0	0	0.000000	27816.02	8.563665	0.460269
P371	22594	1	0.000025	0	0	0.000000	31951.80	10.086681	0.181629
P372	22745	1	0.000025	0	0	0.000000	31231.80	8.874223	0.000000
P373	22779	1	0.000025	0	0	0.000000	33031.80	10.944150	0.000000
P374	22840	1	0.000025	0	0	0.000000	11689.92	13.980924	0.920898
P375	22858	1	0.000025	0	0	0.000000	35240.72	6.125433	0.844053
P376	22904	1	0.000025	0	0	0.000000	25491.02	6.457349	0.000000
P377	22932	1	0.000025	0	0	0.000000	32956.80	9.940696	0.000000
P378	22936	1	0.000025	0	0	0.000000	32956.80	9.940696	0.000000
P379	22946	1	0.000025	0	0	0.000000	12933.72	11.401535	0.900000
P380	22969	1	0.000025	0	0	0.000000	31156.80	7.974844	0.000000
P381	22975	1	0.000025	0	0	0.000000	27916.80	6.105316	0.400241
P382	22978	1	0.000025	0	0	0.000000	32416.80	9.554477	0.381459
P383	23033	1	0.000025	0	0	0.000000	32881.80	8.968011	0.000000
P384	23043	1	0.000025	0	0	0.000000	24102.35	2.282524	0.000000
P385	23074	1	0.000025	0	0	0.000000	30691.80	8.457936	0.000000
P386	23084	1	0.000025	0	0	0.000000	27816.02	8.521945	0.039205
P387	23085	1	0.000025	0	0	0.000000	27451.80	6.586775	0.176015
P388	23086	1	0.000025	0	0	0.000000	27451.80	6.586775	0.176015
P389	23097	1	0.000025	21690	1	0.000025	27816.02	8.563665	0.460269
P390	23098	1	0.000025	0	0	0.000000	23766.02	5.628606	0.820184
P391	23113	1	0.000025	0	0	0.000000	31825.94	7.045014	0.000000
P392	23214	1	0.000025	0	0	0.000000	29251.80	8.537842	0.066469
P393	23325	1	0.000025	0	0	0.000000	10920.00	5.010032	0.187450
P394	23336	1	0.000025	0	0	0.000000	31156.80	7.974844	0.000000
P395	23350	1	0.000025	0	0	0.000000	27916.80	6.125433	0.844053
P396	23411	1	0.000025	21804	1	0.000025	31156.80	7.974844	0.000000
P397	23416	1	0.000025	0	0	0.000000	35240.72	6.125433	0.844053
P398	23500	1	0.000025	0	0	0.000000	27916.80	6.105316	0.400241
P399	23559	1	0.000025	0	0	0.000000	6195.00	0.130934	0.524682
P400	23566	1	0.000025	0	0	0.000000	33327.58	7.781791	0.000000
P401	23653	1	0.000025	0	0	0.000000	27486.02	6.846032	0.000000
P402	23655	1	0.000025	0	0	0.000000	27486.02	6.846032	0.000000
P403	23698	1	0.000025	0	0	0.000000	31680.02	7.969190	0.221632
P404	23700	1	0.000025	0	0	0.000000	25506.02	6.572779	0.650013
P405	23760	1	0.000025	0	0	0.000000	30690.16	8.021152	0.000000
P406	23936	1	0.000025	0	0	0.000000	33480.02	9.976605	0.441867
P407	24009	1	0.000025	0	0	0.000000	33480.02	9.849047	0.000000
P408	24025	1	0.000025	14128	2	0.000050	33480.02	9.964711	0.092020
P409	24186	1	0.000025	0	0	0.000000	35280.02	11.816866	0.000000
P410	24218	1	0.000025	0	0	0.000000	14784.00	4.456101	0.131393
P411	24384	1	0.000025	0	0	0.000000	30021.02	8.976694	0.086912
P412	24520	1	0.000025	0	0	0.000000	24712.25	3.324900	1.204772
P413	24604	1	0.000025	0	0	0.000000	30561.02	9.377619	0.000000
P414	24676	1	0.000025	0	0	0.000000	27246.02	6.573378	0.380611
P415	24713	1	0.000025	0	0	0.000000	27711.02	6.036090	0.228901
P416	24714	1	0.000025	0	0	0.000000	29511.02	8.027692	0.124111
P417	24715	1	0.000025	0	0	0.000000	25041.73	5.409718	0.000000
P418	24716	1	0.000025	0	0	0.000000	14523.72	1.650984	0.000000
P419	24731	1	0.000025	23176	1	0.000025	30931.80	7.208763	0.000000
P420	24788	1	0.000025	0	0	0	32731.80	9.072107	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P507	29699	1	0.000025	0	0	0.000000	34665.02	10.480447	0.684403
P508	29715	1	0.000025	0	0	0.000000	27915.16	5.635576	0.351387
P509	29768	1	0.000025	0	0	0.000000	29031.02	9.439457	0.104569
P510	29983	1	0.000025	0	0	0.000000	26781.02	7.056919	0.312468
P511	29984	1	0.000025	0	0	0.000000	27231.02	7.495838	0.041271
P512	29994	1	0.000025	0	0	0.000000	26781.02	7.018553	0.331328
P513	30043	1	0.000025	0	0	0.000000	32271.02	11.401885	0.000000
P514	30060	1	0.000025	0	0	0.000000	30561.02	9.377693	0.000000
P516	30286	1	0.000025	0	0	0.000000	41979.44	6.792725	0.275276
P517	30300	1	0.000025	0	0	0.000000	29881.80	5.850014	0.108881
P519	30499	1	0.000025	0	0	0.000000	33180.02	8.103383	0.000000
P520	30520	1	0.000025	0	0	0.000000	26556.02	6.280949	0.819780
P521	30521	1	0.000025	0	0	0.000000	26556.02	6.280949	0.819780
P522	30716	1	0.000025	0	0	0.000000	9660.00	12.581876	0.900000
P523	30738	1	0.000025	0	0	0.000000	28281.02	7.265829	1.003054
P524	30884	1	0.000025	0	0	0.000000	8175.00	0.124499	0.520228
P525	30894	1	0.000025	0	0	0.000000	32431.80	7.405739	0.000000
P526	30993	1	0.000025	0	0	0.000000	33180.02	8.103383	0.000000
P527	31123	1	0.000025	0	0	0.000000	30786.02	8.988902	0.000000
P528	31164	1	0.000025	0	0	0.000000	28356.02	8.176294	0.064601
P529	31269	1	0.000025	0	0	0.000000	28821.02	7.650008	0.341261
P531	31307	1	0.000025	0	0	0.000000	27021.02	5.753400	0.838417
P532	31348	1	0.000025	0	0	0.000000	8175.00	0.124499	0.520228
P533	31349	1	0.000025	0	0	0.000000	26735.29	0.605924	0.155138
P535	31570	1	0.000025	12142	3	0.000075	30931.80	7.208451	0.000000
P536	31705	1	0.000025	0	0	0.000000	17272.44	0.139530	0.524804
P537	31848	1	0.000025	0	0	0.000000	32191.80	8.746014	0.110847
P538	31854	1	0.000025	0	0	0.000000	28951.80	6.831233	1.039452
P539	31886	1	0.000025	0	0	0.000000	33001.80	7.342519	0.000000
P540	31988	1	0.000025	0	0	0.000000	34827.58	7.979383	0.000000
P541	32064	1	0.000025	0	0	0.000000	32431.80	7.318639	0.000000
P542	32166	1	0.000025	0	0	0.000000	31680.02	7.898957	0.000000
P543	32375	1	0.000025	0	0	0.000000	30816.02	8.605844	0.382634
P544	32520	1	0.000025	0	0	0.000000	26856.02	8.017973	0.881644
P545	32608	1	0.000025	0	0	0.000000	33480.02	9.874474	0.000000
P546	32717	1	0.000025	0	0	0.000000	25859.14	6.409543	0.296292
P547	32740	1	0.000025	0	0	0.000000	30021.02	8.976537	0.087333
P548	32741	1	0.000025	0	0	0.000000	26781.02	7.056919	0.312468
P549	32762	1	0.000025	0	0	0.000000	31155.16	7.543878	0.000000
P550	32830	1	0.000025	0	0	0.000000	31821.02	10.837326	0.000000
P551	32875	1	0.000025	0	0	0.000000	29211.02	7.809705	0.000000
P552	33187	1	0.000025	0	0	0.000000	29046.02	8.350906	0.000000
P553	33218	1	0.000025	0	0	0.000000	7935.00	0.127270	0.516541
P555	33495	1	0.000025	0	0	0.000000	29416.80	6.267395	0.279965
P556	33574	1	0.000025	0	0	0.000000	32370.02	7.041844	0.000000
P557	33576	1	0.000025	0	0	0.000000	32370.02	7.041844	0.000000
P559	33755	1	0.000025	0	0	0.000000	31596.02	10.176209	0.131929
P560	33843	1	0.000025	0	0	0.000000	27021.02	5.739132	0.420551
P561	34027	1	0.000025	0	0	0.000000	30916.80	6.525720	0.762003
P562	34033	1	0.000025	0	0	0.000000	30916.80	6.372666	0.000000
P563	34038	1	0.000025	0	0	0.000000	33552.58	5.787324	0.172249
P564	34075	1	0.000025	0	0	0.000000	33180.02	8.181092	0.127558
P566	34317	1	0.000025	0	0	0.000000	27021.02	5.753400	0.838417
P567	34410	1	0.000025	17141	2	0.000050	8175.00	0.124499	0.520228
P568	34454	1	0.000025	0	0	0.000000	32431.80	7.405739	0.000000
P569	34755	1	0.000025	0	0	0.000000	39103.66	6.792411	0.275355
P570	34927	1	0.000025	0	0	0.000000	44049.64	7.276907	0.218014
P571	34929	1	0.000025	0	0	0.000000	28951.80	6.831233	1.039452
P572	35191	1	0.000025	0	0	0.000000	30916.80	6.372192	0.000000
P573	35309	1	0.000025	0	0	0.000000	26556.02	6.290840	1.209888
P574	35310	1	0.000025	0	0	0.000000	27816.02	7.809295	1.007864
P575	35485	1	0.000025	0	0	0.000000	35674.40	5.216389	0.175032
P576	35530	1	0.000025	32908	1	0.000025	30261.02	7.524056	0.000000
P577	35645	1	0.000025	0	0	0.000000	8175.00	0.106030	0.541228
P578	35661	1	0.000025	0	0	0.000000	34825.94	7.538771	0.000000
P579	35746	1	0.000025	0	0	0.000000	30486.02	7.238287	0.000000
P580	35881	1	0.000025	0	0	0.000000	30486.02	7.238287	0.000000
P581	36352	1	0.000025	0	0	0.000000	38118.32	3.164648	0.368211
P582	37059	1	0.000025	0	0	0.000000	24076.80	5.222550	0.000000
P586	37203	1	0.000025	0	0	0.000000	4071.00	2.524081	0.000000
P589	37206	1	0.000025	0	0	0.000000	2346.00	5.313743	0.000000
P593	37218	1	0.000025	0	0	0.000000	3291.00	0.000000	0.118596
P594	37219	1	0.000025	36455	1	0.000025	3291.00	0.000000	0.118596
P595	37229	1	0.000025	0	0	0.000000	3291.00	0.000000	0.118596
P598	37233	1	0.000025	0	0	0.000000	11604.01	5.739777	0.000000
P608	37953	1	0.000025	0	0	0.000000	15537.83	2.706769	0.000000
P609	37971	1	0.000025	0	0	0.000000	22905.84	4.778274	0.012606
P610	37978	1	0.000025	0	0	0.000000	16812.83	3.195813	0.000000
P611	38020	1	0.000025	0	0	0.000000	26261.62	5.080281	0.000000
P612	38025	1	0.000025	0	0	0.000000	23865.84	4.486681	0.000000
P613	38148	1	0.000025	0	0	0.000000	21105.84	2.856768	0.030083

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P772	41061	1	0.000025	0	0	0.000000	13700.17	0.580383	0.000000
P773	41062	1	0.000025	0	0	0.000000	3182.16	0.000000	0.151323
P774	41063	1	0.000025	0	0	0.000000	3197.16	0.000000	0.008874
P775	41064	1	0.000025	0	0	0.000000	3197.16	0.000000	0.008874
P776	41065	1	0.000025	0	0	0.000000	2387.16	0.000000	0.009039
P777	41066	1	0.000025	0	0	0.000000	2387.16	0.000000	0.009039
P778	41067	1	0.000025	0	0	0.000000	2387.16	0.000000	0.009039
P779	41068	1	0.000025	0	0	0.000000	8238.31	0.000000	0.009039
P780	41069	1	0.000025	0	0	0.000000	13715.17	0.511489	0.000000
P781	41070	1	0.000025	0	0	0.000000	3197.16	0.000000	0.018148
P782	41071	1	0.000025	0	0	0.000000	17478.20	0.000000	0.009754
P783	41072	1	0.000025	0	0	0.000000	14525.17	0.000000	0.016684
P784	41073	1	0.000025	0	0	0.000000	25493.18	3.596762	0.151272
P785	41074	1	0.000025	0	0	0.000000	3737.16	0.000000	0.015561
P786	41075	1	0.000025	0	0	0.000000	3662.16	0.000000	0.015767
P787	41076	1	0.000025	0	0	0.000000	14180.17	0.101971	0.000000
P788	41077	1	0.000025	0	0	0.000000	3197.16	0.000000	0.008874
P789	41078	1	0.000025	0	0	0.000000	2387.16	0.000000	0.009039
P790	41079	1	0.000025	0	0	0.000000	20358.20	3.984637	0.245121
P791	41080	1	0.000025	0	0	0.000000	16955.17	2.359755	0.000000
P792	41081	1	0.000025	0	0	0.000000	26376.21	0.000000	0.010870
P793	41082	1	0.000025	0	0	0.000000	17478.20	0.000000	0.009754
P794	41083	1	0.000025	0	0	0.000000	17478.20	0.000000	0.009754
P795	41084	1	0.000025	0	0	0.000000	19025.17	2.496434	0.000000
P796	41085	1	0.000025	0	0	0.000000	4007.16	0.000000	0.009754
P797	41086	1	0.000025	0	0	0.000000	4997.16	0.000000	0.013132
P798	41087	1	0.000025	0	0	0.000000	4187.16	0.000000	0.017398
P799	41088	1	0.000025	0	0	0.000000	3737.16	0.000000	0.015561
P800	41089	1	0.000025	0	0	0.000000	4997.16	0.000000	0.013132
P801	41090	1	0.000025	0	0	0.000000	14180.17	0.088418	0.000000
P802	41091	1	0.000025	0	0	0.000000	7457.16	0.000000	0.208338
P803	41092	1	0.000025	0	0	0.000000	17358.20	0.000000	0.064239
P804	41093	1	0.000025	0	0	0.000000	13955.17	0.000000	0.065256
P805	41094	1	0.000025	0	0	0.000000	25492.12	0.000000	0.076631
P806	41095	1	0.000025	0	0	0.000000	17925.08	0.633844	0.000000
P807	41096	1	0.000025	0	0	0.000000	3182.16	0.000000	0.131665
P808	41097	1	0.000025	0	0	0.000000	9341.16	0.000000	0.124842
P809	41098	1	0.000025	0	0	0.000000	2717.16	0.000000	0.123157
P810	41099	1	0.000025	40473	1	0.000025	2717.16	0.000000	0.123157
P811	41100	1	0.000025	0	0	0.000000	20559.09	1.035226	0.000000
P812	41101	1	0.000025	0	0	0.000000	11975.17	0.000000	0.128348
P813	41102	1	0.000025	0	0	0.000000	5777.16	0.677539	0.000000
P814	41103	1	0.000025	0	0	0.000000	3182.16	0.000000	0.131665
P815	41104	1	0.000025	0	0	0.000000	4217.16	0.000000	0.184216
P816	41105	1	0.000025	0	0	0.000000	4682.16	0.000000	0.192265
P817	41106	1	0.000025	0	0	0.000000	2957.16	0.000000	0.184216
P818	41107	1	0.000025	0	0	0.000000	3197.16	0.000000	0.003501
P819	41108	1	0.000025	0	0	0.000000	13715.17	0.511155	0.000000
P820	41109	1	0.000025	0	0	0.000000	26376.21	0.000000	0.011134
P821	41110	1	0.000025	0	0	0.000000	3197.16	0.000000	0.012776
P822	41111	1	0.000025	0	0	0.000000	14525.17	0.000000	0.011176
P823	41112	1	0.000025	0	0	0.000000	14525.17	0.000000	0.011308
P824	41113	1	0.000025	0	0	0.000000	6257.16	0.196246	0.000000
P825	41114	1	0.000025	0	0	0.000000	11368.28	0.000000	0.010598
P826	41115	1	0.000025	0	0	0.000000	11368.28	0.000000	0.010598
P827	41116	1	0.000025	0	0	0.000000	5807.16	0.000000	0.010908
P828	41117	1	0.000025	0	0	0.000000	5462.16	0.000000	0.014845
P829	41118	1	0.000025	0	0	0.000000	7187.16	0.242231	0.000000
P830	41119	1	0.000025	0	0	0.000000	13475.17	0.000000	0.202644
P831	41120	1	0.000025	40007	1	0.000025	3437.16	0.000000	0.058332
P832	41121	1	0.000025	0	0	0.000000	5162.16	0.000000	0.065809
P833	41122	1	0.000025	0	0	0.000000	13955.17	0.000000	0.062576
P834	41123	1	0.000025	0	0	0.000000	32179.25	0.000000	0.065225
P835	41124	1	0.000025	0	0	0.000000	2957.16	0.000000	0.179021
P836	41125	1	0.000025	0	0	0.000000	2957.16	0.000000	0.179021
P837	41126	1	0.000025	0	0	0.000000	6437.16	0.000000	0.003501
P838	41127	1	0.000025	0	0	0.000000	3197.16	0.000000	0.003501
P839	41128	1	0.000025	0	0	0.000000	4457.16	0.000000	0.003501
P840	41129	1	0.000025	0	0	0.000000	13715.17	0.511155	0.000000
P841	41130	1	0.000025	0	0	0.000000	3197.16	0.000000	0.015702
P842	41131	1	0.000025	0	0	0.000000	17478.20	0.000000	0.004381
P843	41132	1	0.000025	0	0	0.000000	8507.16	0.000000	0.004381
P844	41133	1	0.000025	0	0	0.000000	17478.20	0.000000	0.004381
P845	41134	1	0.000025	0	0	0.000000	5267.16	0.000000	0.016701
P846	41135	1	0.000025	0	0	0.000000	3737.16	0.000000	0.010165
P847	41136	1	0.000025	0	0	0.000000	3737.16	0.000000	0.010165
P848	41137	1	0.000025	0	0	0.000000	4997.16	0.000000	0.016066
P849	41138	1	0.000025	0	0	0.000000	24773.18	4.929315	0.150575
P850	41139	1	0.000025	0	0	0.000000	3662.16	0.000000	0.010372
P851	41140	1	0.000025	0	0	0.000000	3662.16	0.000000	0.010372
P852	41141	1	0.000025	0	0	0.000000	4217.16	0.000000	0.198502

Annex 10

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State Position	Occurrences	Occurrence (%)	State Position	Occurrences	Occurrence (%)		p.u.	p.u.
P4	2357	41	0.001025	3451	21	0.000525	5175.00	0.104866	0.530987
P5	2533	35	0.000875	3855	17	0.000425	28725.00	7.217953	0.000000
P6	2538	35	0.000875	3915	17	0.000425	28725.00	7.217953	0.000000
P9	2846	29	0.000725	4837	12	0.000300	28725.00	7.217953	0.000000
P10	2963	27	0.000675	4153	15	0.000375	28260.00	7.703672	0.000000
P11	2965	27	0.000675	4163	15	0.000375	28260.00	7.768486	0.066125
P12	3038	27	0.000675	4108	17	0.000425	2392.50	0.000000	0.003501
P13	3127	25	0.000625	3889	17	0.000425	28260.00	7.703672	0.000000
P14	3129	25	0.000625	3998	16	0.000400	28260.00	7.771335	0.232256
P15	3219	25	0.000625	5530	11	0.000275	2392.50	0.000000	0.003501
P17	3506	22	0.000550	4702	14	0.000350	2392.50	0.000000	0.008874
P19	3871	19	0.000475	4492	15	0.000375	2392.50	0.000000	0.008874
P23	4177	16	0.000400	8126	5	0.000125	25020.00	5.875300	1.116335
P25	4624	14	0.000350	5808	9	0.000225	28020.00	6.923139	0.000000
P29	4864	13	0.000325	7463	6	0.000150	28020.00	6.923139	0.000000
P30	4915	13	0.000325	9924	4	0.000100	28020.00	7.013424	0.000000
P34	5478	11	0.000275	6938	7	0.000175	28020.00	7.013424	0.000000
P38	5984	10	0.000250	8287	6	0.000150	11280.00	0.555012	0.000000
P40	6037	9	0.000225	7353	6	0.000150	16650.00	4.703312	0.195088
P41	6079	9	0.000225	21486	1	0.000025	16425.00	1.828660	0.000000
P42	6246	9	0.000225	28939	1	0.000025	6675.00	0.106980	0.533908
P43	6314	9	0.000225	32182	1	0.000025	6675.00	0.106980	0.533908
P44	6411	9	0.000225	11016	4	0.000100	11280.00	0.571273	0.000000
P45	6412	9	0.000225	9454	5	0.000125	1530.00	2.623476	0.695469
P46	6497	8	0.000200	11052	3	0.000075	16650.00	4.679733	0.420027
P47	6938	8	0.000200	13733	3	0.000075	1530.00	2.623476	0.695469
P51	7148	7	0.000175	0	0	0.000000	30225.00	7.411881	0.000000
P52	7404	7	0.000175	0	0	0.000000	29760.00	7.898957	0.000000
P56	7618	7	0.000175	40991	1	0.000025	1912.50	0.000000	0.123157
P57	7736	6	0.000150	7340	6	0.000150	9900.00	4.259466	0.150264
P59	8260	6	0.000150	31261	1	0.000025	30225.00	7.328216	0.000000
P60	8404	6	0.000150	37007	1	0.000025	44280.00	6.272335	0.000000
P61	8469	6	0.000150	9453	5	0.000125	4530.00	0.149021	0.000000
P65	8615	5	0.000125	13803	2	0.000050	6660.00	2.716584	1.027858
P66	8710	5	0.000125	8319	5	0.000125	16425.00	1.812466	0.000000
P67	8938	5	0.000125	0	0	0.000000	29520.00	7.208763	0.000000
P68	9545	5	0.000125	9493	5	0.000125	34560.00	4.357290	0.000000
P72	9588	5	0.000125	13784	3	0.000075	1912.50	0.000000	0.142712
P73	9621	5	0.000125	18938	2	0.000050	22602.00	2.864822	0.478655
P77	9657	4	0.000100	0	0	0.000000	29520.00	9.309030	0.010931
P78	9850	4	0.000100	0	0	0.000000	29985.00	8.796064	0.402722
P79	10221	4	0.000100	14915	2	0.000050	30225.00	7.411881	0.000000
P80	10236	4	0.000100	11600	3	0.000075	30225.00	7.411881	0.000000
P81	10712	4	0.000100	30709	1	0.000025	29760.00	8.003736	0.450664
P86	11180	4	0.000100	40755	1	0.000025	1755.00	2.884545	0.459485
P91	11185	4	0.000100	40161	1	0.000025	6892.50	0.000000	0.008874
P92	11186	4	0.000100	40127	1	0.000025	3892.50	0.000000	0.064073
P93	11187	4	0.000100	18835	2	0.000050	3652.50	0.000000	0.003501
P99	11351	3	0.000075	0	0	0.000000	30060.00	9.679254	0.000000
P100	11355	3	0.000075	19107	1	0.000025	30060.00	9.765302	0.099082
P101	11456	3	0.000075	0	0	0.000000	27900.00	8.638701	0.000000
P102	11466	3	0.000075	19940	1	0.000025	29985.00	8.666728	0.000000
P103	11472	3	0.000075	0	0	0.000000	26745.00	6.824009	0.336246
P104	11494	3	0.000075	0	0	0.000000	30525.00	9.182728	0.000000
P105	11663	3	0.000075	21626	1	0.000025	9675.00	1.407775	0.000000
P106	11664	3	0.000075	0	0	0.000000	7245.00	0.104617	0.531847
P107	11665	3	0.000075	0	0	0.000000	6975.00	0.168612	0.483151
P108	11666	3	0.000075	21666	1	0.000025	6975.00	0.168612	0.483151
P109	11698	3	0.000075	0	0	0.000000	29820.00	8.874223	0.000000
P110	11765	3	0.000075	0	0	0.000000	29820.00	8.874223	0.000000
P112	11949	3	0.000075	23059	1	0.000025	30225.00	7.411881	0.000000
P113	11973	3	0.000075	23706	1	0.000025	6675.00	0.105420	0.537765
P114	12024	3	0.000075	0	0	0.000000	28950.00	6.846032	0.000000
P115	12196	3	0.000075	15215	2	0.000050	6675.00	0.105420	0.537765
P116	12563	3	0.000075	15643	2	0.000050	29760.00	7.898957	0.000000
P117	12650	3	0.000075	11966	3	0.000075	30225.00	7.328216	0.000000
P118	12679	3	0.000075	28193	1	0.000025	30225.00	7.328216	0.000000
P119	12926	3	0.000075	16433	2	0.000050	29520.00	7.208451	0.000000
P120	12978	3	0.000075	0	0	0.000000	29760.00	7.981699	0.134225
P121	13349	3	0.000075	0	0	0.000000	29520.00	7.208451	0.000000
P125	13605	3	0.000075	0	0	0.000000	41040.00	4.379414	0.476218
P126	13820	3	0.000075	0	0	0.000000	22530.00	4.614999	0.242795
P127	13821	3	0.000075	9429	5	0.000125	1290.00	7.056883	0.115336
P128	13822	3	0.000075	0	0	0.000000	3330.00	2.829131	0.540000
P133	13827	3	0.000075	18715	2	0.000050	13642.50	0.000000	0.015886
P134	13828	3	0.000075	19126	2	0.000050	1912.50	0.000000	0.123157
P135	13829	3	0.000075	18805	2	0.000050	6892.50	0.000000	0.003501
P136	13830	3	0.000075	40057	1	0.000025	13642.50	0.000000	0.010358
P137	13831	3	0.000075	0	0	0.000000	13642.50	0.000000	0.010358
P138	13832	3	0.000075	0	0	0.000000	13642.50	0.000000	0.010511
P139	13833	3	0.000075	0	0	0.000000	3892.50	0.000000	0.058332

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P242	19324	2	0.000050	0	0	0.000000	8392.50	0.000000	0.058478
P246	19481	2	0.000050	0	0	0.000000	18172.50	0.000000	0.108977
P248	19501	2	0.000050	19014	2	0.000050	15852.00	2.245153	0.000000
P249	19502	2	0.000050	18915	2	0.000050	13152.00	0.786903	0.000000
P250	19503	2	0.000050	0	0	0.000000	13152.00	0.786903	0.000000
P259	19512	2	0.000050	0	0	0.000000	3327.00	2.645184	0.346379
P260	19513	2	0.000050	0	0	0.000000	3327.00	2.645184	0.346379
P264	19517	2	0.000050	41375	1	0.000025	3327.00	2.645184	0.346379
P265	19625	1	0.000025	0	0	0.000000	28710.00	8.184258	0.000000
P266	19627	1	0.000025	0	0	0.000000	28710.00	8.184258	0.000000
P267	19629	1	0.000025	0	0	0.000000	27900.00	7.169563	0.000000
P268	19668	1	0.000025	0	0	0.000000	26280.00	7.371076	0.085040
P269	19669	1	0.000025	0	0	0.000000	28710.00	8.266380	0.030280
P270	19670	1	0.000025	0	0	0.000000	25470.00	6.318875	0.088312
P271	19671	1	0.000025	0	0	0.000000	25470.00	6.318875	0.088312
P272	19673	1	0.000025	0	0	0.000000	25470.00	6.318875	0.088312
P273	19711	1	0.000025	0	0	0.000000	29520.00	9.312202	0.176447
P274	19712	1	0.000025	0	0	0.000000	28710.00	8.285591	0.365915
P275	19713	1	0.000025	0	0	0.000000	25470.00	6.358640	0.707904
P276	19734	1	0.000025	0	0	0.000000	29520.00	9.315133	0.717834
P277	19735	1	0.000025	18676	1	0.000025	26280.00	7.381755	0.899925
P278	19770	1	0.000025	0	0	0.000000	30330.00	7.902790	0.180837
P279	19778	1	0.000025	0	0	0.000000	30330.00	7.922740	0.505317
P280	19779	1	0.000025	0	0	0.000000	30780.00	8.404884	0.401428
P281	19813	1	0.000025	0	0	0.000000	30330.00	7.837350	0.000000
P282	19814	1	0.000025	0	0	0.000000	30330.00	7.837350	0.000000
P283	19847	1	0.000025	0	0	0.000000	30330.00	7.922740	0.505317
P284	19891	1	0.000025	0	0	0.000000	30330.00	7.837350	0.000000
P285	19910	1	0.000025	0	0	0.000000	30330.00	7.902790	0.180837
P286	19927	1	0.000025	0	0	0.000000	27090.00	6.013084	1.308471
P287	19987	1	0.000025	0	0	0.000000	29520.00	6.772041	0.000000
P288	20011	1	0.000025	0	0	0.000000	30330.00	7.922740	0.505317
P289	20015	1	0.000025	0	0	0.000000	27090.00	6.013084	1.308471
P290	20118	1	0.000025	19050	1	0.000025	30330.00	7.922740	0.505317
P291	20120	1	0.000025	0	0	0.000000	26730.00	5.418996	0.522541
P292	20220	1	0.000025	0	0	0.000000	30060.00	9.679254	0.000000
P293	20251	1	0.000025	0	0	0.000000	30060.00	9.787872	0.433931
P294	20258	1	0.000025	0	0	0.000000	26820.00	7.865877	1.134483
P295	20415	1	0.000025	0	0	0.000000	30060.00	9.679254	0.000000
P296	20450	1	0.000025	0	0	0.000000	31320.00	11.272625	0.065904
P297	20612	1	0.000025	0	0	0.000000	31860.00	11.652750	0.000000
P298	20685	1	0.000025	0	0	0.000000	30060.00	9.679254	0.000000
P299	20707	1	0.000025	19587	1	0.000025	30060.00	9.765302	0.099082
P300	20726	1	0.000025	0	0	0.000000	30060.00	9.787872	0.433931
P301	20731	1	0.000025	0	0	0.000000	26820.00	7.865877	1.134483
P303	21010	1	0.000025	19848	1	0.000025	21150.00	8.094221	0.036944
P304	21011	1	0.000025	0	0	0.000000	17910.00	6.191200	0.031789
P305	21012	1	0.000025	0	0	0.000000	17100.00	5.149065	0.473020
P306	21013	1	0.000025	0	0	0.000000	7920.00	10.962353	0.900000
P307	21014	1	0.000025	0	0	0.000000	17910.00	6.231711	0.147751
P308	21016	1	0.000025	0	0	0.000000	7920.00	3.859111	0.324271
P309	21017	1	0.000025	0	0	0.000000	17910.00	6.217509	0.117100
P311	21020	1	0.000025	0	0	0.000000	18720.00	4.818424	0.326203
P312	21060	1	0.000025	0	0	0.000000	29985.00	8.666728	0.000000
P313	21066	1	0.000025	0	0	0.000000	30435.00	9.151027	0.000000
P314	21083	1	0.000025	0	0	0.000000	26745.00	6.815908	0.165612
P315	21097	1	0.000025	0	0	0.000000	30435.00	9.230557	0.072865
P316	21203	1	0.000025	0	0	0.000000	30795.00	7.254903	0.000000
P317	21238	1	0.000025	20081	1	0.000025	30525.00	9.182728	0.000000
P318	21245	1	0.000025	0	0	0.000000	31785.00	10.663817	0.000000
P319	21297	1	0.000025	0	0	0.000000	30975.00	9.560745	0.000000
P320	21369	1	0.000025	0	0	0.000000	31785.00	10.641970	0.000000
P321	21381	1	0.000025	0	0	0.000000	28995.00	9.244230	0.107052
P322	21434	1	0.000025	0	0	0.000000	20445.00	5.785721	0.324875
P323	21471	1	0.000025	0	0	0.000000	29985.00	8.666728	0.000000
P324	21472	1	0.000025	0	0	0.000000	26745.00	6.739362	0.000000
P325	21473	1	0.000025	0	0	0.000000	29175.00	7.614536	0.000000
P326	21474	1	0.000025	0	0	0.000000	30435.00	9.151027	0.000000
P327	21476	1	0.000025	0	0	0.000000	27195.00	7.294194	0.000000
P328	21487	1	0.000025	20373	1	0.000025	29985.00	8.792065	0.085404
P329	21488	1	0.000025	0	0	0.000000	26745.00	6.815908	0.165612
P330	21489	1	0.000025	0	0	0.000000	25935.00	5.824214	0.327099
P331	21499	1	0.000025	0	0	0.000000	25935.00	5.809104	0.378783
P332	21531	1	0.000025	0	0	0.000000	30795.00	7.254903	0.000000
P333	21649	1	0.000025	20439	1	0.000025	30525.00	9.182728	0.000000
P334	21702	1	0.000025	0	0	0.000000	30975.00	9.560745	0.000000
P335	21770	1	0.000025	20459	1	0.000025	30525.00	9.182728	0.000000
P336	21840	1	0.000025	0	0	0.000000	19635.00	7.138684	0.343240
P337	21841	1	0.000025	20684	1	0.000025	8385.00	3.354206	0.540000
P338	21861	1	0.000025	0	0	0.000000	30450.00	8.211021	0.000000
P339	21862	1	0.000025	0	0	0.000000	27210.00	6.217760	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P421	24874	1	0.000025	0	0	0.000000	29520.00	7.208763	0.000000
P422	24979	1	0.000025	0	0	0.000000	28005.00	6.174618	0.000000
P423	25046	1	0.000025	14775	2	0.000050	28950.00	6.846032	0.000000
P424	25049	1	0.000025	0	0	0.000000	28950.00	6.846032	0.000000
P425	25076	1	0.000025	0	0	0.000000	27780.00	7.587687	0.189144
P426	25103	1	0.000025	0	0	0.000000	30210.00	8.454344	0.102408
P427	25135	1	0.000025	0	0	0.000000	31830.00	8.122696	0.489787
P428	25281	1	0.000025	0	0	0.000000	31830.00	8.021152	0.000000
P429	25425	1	0.000025	0	0	0.000000	30750.00	8.792869	0.000000
P430	25657	1	0.000025	0	0	0.000000	8160.00	2.561193	0.471714
P431	25658	1	0.000025	0	0	0.000000	12660.00	5.985897	0.000901
P433	25660	1	0.000025	0	0	0.000000	9420.00	4.068702	0.424263
P434	25661	1	0.000025	0	0	0.000000	8160.00	2.566527	0.769272
P436	25697	1	0.000025	0	0	0.000000	31485.00	8.993900	0.395663
P437	25755	1	0.000025	0	0	0.000000	32025.00	9.377619	0.000000
P438	25810	1	0.000025	0	0	0.000000	9885.00	12.156970	0.900000
P439	25953	1	0.000025	0	0	0.000000	28710.00	6.523352	0.478149
P440	25992	1	0.000025	0	0	0.000000	28245.00	7.010808	0.160406
P441	25997	1	0.000025	0	0	0.000000	27435.00	6.036671	0.683148
P442	26015	1	0.000025	0	0	0.000000	32295.00	7.449984	0.000000
P443	26023	1	0.000025	0	0	0.000000	32295.00	7.449984	0.000000
P444	26142	1	0.000025	0	0	0.000000	28710.00	6.412721	0.000000
P445	26163	1	0.000025	0	0	0.000000	7125.00	0.105142	0.538141
P446	26164	1	0.000025	0	0	0.000000	17925.00	2.016236	0.000000
P447	26165	1	0.000025	0	0	0.000000	22425.00	5.359724	0.000000
P448	26166	1	0.000025	0	0	0.000000	8745.00	0.118134	0.524857
P449	26241	1	0.000025	0	0	0.000000	32580.00	10.631390	0.000000
P450	26271	1	0.000025	0	0	0.000000	28005.00	6.308840	0.390339
P451	26326	1	0.000025	24812	1	0.000025	29520.00	7.208763	0.000000
P452	26456	1	0.000025	0	0	0.000000	30540.00	7.980731	0.000000
P453	26458	1	0.000025	0	0	0.000000	28560.00	7.563598	0.325218
P454	26740	1	0.000025	0	0	0.000000	31725.00	7.606892	0.000000
P455	26747	1	0.000025	0	0	0.000000	29745.00	7.286637	1.096187
P457	26836	1	0.000025	24908	1	0.000025	31020.00	7.319520	0.000000
P458	26936	1	0.000025	0	0	0.000000	29280.00	8.457416	0.000000
P459	26937	1	0.000025	0	0	0.000000	30180.00	9.422754	0.000000
P460	26939	1	0.000025	0	0	0.000000	26490.00	7.087377	0.000000
P461	26959	1	0.000025	0	0	0.000000	29280.00	8.543062	0.116872
P462	26960	1	0.000025	0	0	0.000000	26040.00	6.586066	0.174217
P463	26970	1	0.000025	0	0	0.000000	26040.00	6.590767	0.348637
P464	26985	1	0.000025	0	0	0.000000	30090.00	7.146561	0.000000
P465	27053	1	0.000025	0	0	0.000000	30180.00	6.830546	0.447106
P466	27203	1	0.000025	0	0	0.000000	17670.00	5.461308	0.239328
P467	27216	1	0.000025	0	0	0.000000	26505.00	6.104656	0.400248
P468	27218	1	0.000025	0	0	0.000000	27765.00	7.568795	0.321683
P469	27284	1	0.000025	0	0	0.000000	31815.00	8.106414	0.000000
P470	27338	1	0.000025	0	0	0.000000	29745.00	7.974352	0.000000
P471	27342	1	0.000025	0	0	0.000000	26505.00	6.104656	0.400248
P472	27394	1	0.000025	0	0	0.000000	10695.00	2.116978	0.000000
P473	27405	1	0.000025	0	0	0.000000	25800.00	5.885186	0.428597
P474	27661	1	0.000025	0	0	0.000000	27300.00	5.979671	0.000000
P475	27760	1	0.000025	0	0	0.000000	31320.00	9.071231	0.000000
P476	27816	1	0.000025	0	0	0.000000	31245.00	8.171190	0.000000
P477	27840	1	0.000025	0	0	0.000000	32610.00	8.112297	0.000000
P478	27934	1	0.000025	0	0	0.000000	29280.00	8.543062	0.116872
P479	28048	1	0.000025	0	0	0.000000	29820.00	8.873598	0.000000
P480	28081	1	0.000025	26575	1	0.000025	29820.00	8.873598	0.000000
P481	28192	1	0.000025	0	0	0.000000	31620.00	10.943797	0.000000
P482	28210	1	0.000025	0	0	0.000000	29745.00	7.974352	0.000000
P483	28260	1	0.000025	0	0	0.000000	28305.00	8.005431	0.338408
P484	28344	1	0.000025	0	0	0.000000	26505.00	6.125154	0.845593
P486	28418	1	0.000025	0	0	0.000000	25800.00	5.885186	0.428597
P487	28500	1	0.000025	0	0	0.000000	27600.00	7.877082	0.363738
P488	28556	1	0.000025	0	0	0.000000	30780.00	8.768499	0.436950
P489	28726	1	0.000025	27202	1	0.000025	29520.00	7.208093	0.000000
P490	28831	1	0.000025	0	0	0.000000	31245.00	8.171190	0.000000
P491	28851	1	0.000025	0	0	0.000000	28005.00	6.173885	0.000000
P492	28995	1	0.000025	0	0	0.000000	30765.00	8.744223	0.000000
P493	29011	1	0.000025	0	0	0.000000	30540.00	7.890992	0.000000
P495	29133	1	0.000025	0	0	0.000000	31020.00	9.510264	0.168200
P496	29142	1	0.000025	0	0	0.000000	26520.00	6.091316	1.229154
P497	29221	1	0.000025	0	0	0.000000	31020.00	7.029003	0.000000
P498	29307	1	0.000025	0	0	0.000000	31830.00	8.032502	0.000000
P499	29314	1	0.000025	0	0	0.000000	28590.00	6.149472	0.245956
P500	29382	1	0.000025	0	0	0.000000	31560.00	9.966702	0.563731
P501	29466	1	0.000025	27411	1	0.000025	31560.00	9.874474	0.000000
P502	29584	1	0.000025	0	0	0.000000	31560.00	9.966702	0.563731
P503	29660	1	0.000025	0	0	0.000000	8160.00	3.030329	0.852260
P504	29678	1	0.000025	0	0	0.000000	31485.00	8.861954	0.000000
P505	29679	1	0.000025	0	0	0.000000	31485.00	8.861954	0.000000
P506	29681	1	0.000025	0	0	0.000000	30675.00	7.809705	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P615	38160	1	0.000025	0	0	0.000000	24374.25	4.826768	0.030083
P616	38218	1	0.000025	0	0	0.000000	40230.00	3.404061	0.280180
P617	38219	1	0.000025	0	0	0.000000	40230.00	3.404061	0.280180
P618	38232	1	0.000025	0	0	0.000000	41040.00	4.438970	0.987456
P619	38289	1	0.000025	0	0	0.000000	42840.00	6.232651	0.000000
P620	38341	1	0.000025	0	0	0.000000	41505.00	3.909133	0.328364
P621	38369	1	0.000025	0	0	0.000000	41505.00	3.909133	0.328364
P623	38525	1	0.000025	0	0	0.000000	43005.00	4.110268	0.315244
P624	38560	1	0.000025	36857	1	0.000025	42060.00	5.147384	0.457745
P625	38581	1	0.000025	0	0	0.000000	45300.00	6.960321	0.000000
P626	38629	1	0.000025	0	0	0.000000	44805.00	6.057717	0.332915
P627	38721	1	0.000025	0	0	0.000000	43005.00	4.110231	0.315797
P628	39001	1	0.000025	0	0	0.000000	26130.00	3.863311	1.290000
P633	39491	1	0.000025	0	0	0.000000	37785.00	3.950593	0.136031
P634	39492	1	0.000025	0	0	0.000000	47010.00	1.443134	0.000000
P636	39494	1	0.000025	0	0	0.000000	37860.00	5.351738	0.026349
P637	39518	1	0.000025	18221	2	0.000050	41040.00	4.347676	0.724106
P638	39523	1	0.000025	0	0	0.000000	43110.00	4.524001	0.833503
P639	39543	1	0.000025	0	0	0.000000	43110.00	4.408829	0.000000
P640	39567	1	0.000025	0	0	0.000000	46080.00	8.281605	0.249311
P642	39635	1	0.000025	0	0	0.000000	46005.00	7.285108	0.168987
P643	39686	1	0.000025	0	0	0.000000	42540.00	4.601590	0.545323
P644	39757	1	0.000025	0	0	0.000000	44610.00	4.664829	0.760013
P645	39816	1	0.000025	0	0	0.000000	42060.00	5.159134	0.513298
P646	39818	1	0.000025	0	0	0.000000	42060.00	5.101609	0.656537
P647	39887	1	0.000025	0	0	0.000000	44610.00	4.602922	0.000000
P648	39997	1	0.000025	0	0	0.000000	44340.00	6.400205	0.000000
P649	40012	1	0.000025	0	0	0.000000	43005.00	3.973536	0.000000
P651	40097	1	0.000025	0	0	0.000000	42399.00	3.901251	1.070733
P652	40120	1	0.000025	0	0	0.000000	62010.00	4.978629	0.000000
P655	40813	1	0.000025	0	0	0.000000	5002.50	0.000000	0.436443
P658	40885	1	0.000025	0	0	0.000000	3502.50	0.011297	0.000000
P665	40954	1	0.000025	0	0	0.000000	12540.00	2.021514	0.000000
P667	40956	1	0.000025	0	0	0.000000	12540.00	2.041719	0.000000
P668	40957	1	0.000025	0	0	0.000000	12990.00	2.532235	0.000000
P669	40958	1	0.000025	0	0	0.000000	2550.00	2.527073	0.000000
P670	40959	1	0.000025	0	0	0.000000	13800.00	3.535886	0.000000
P671	40960	1	0.000025	0	0	0.000000	6600.00	0.255215	0.000000
P673	40962	1	0.000025	0	0	0.000000	7860.00	1.709327	0.000000
P674	40963	1	0.000025	0	0	0.000000	13080.00	2.445791	0.000000
P675	40964	1	0.000025	0	0	0.000000	13080.00	2.458896	0.000000
P676	40965	1	0.000025	0	0	0.000000	3090.00	0.211995	0.000000
P677	40966	1	0.000025	0	0	0.000000	3630.00	0.649224	0.121423
P679	40968	1	0.000025	40919	1	0.000025	1755.00	2.884545	0.459485
P680	40969	1	0.000025	40099	1	0.000025	13005.00	0.571273	0.000000
P681	40970	1	0.000025	0	0	0.000000	17505.00	3.912850	0.000000
P684	40973	1	0.000025	0	0	0.000000	16800.00	4.658643	0.000000
P686	40975	1	0.000025	0	0	0.000000	6030.00	0.332382	0.000000
P687	40976	1	0.000025	0	0	0.000000	12780.00	0.759373	0.000000
P689	40978	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P690	40979	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P691	40980	1	0.000025	0	0	0.000000	3330.00	2.829131	0.540000
P692	40981	1	0.000025	0	0	0.000000	9900.00	2.325641	0.000000
P695	40984	1	0.000025	0	0	0.000000	12780.00	0.759373	0.000000
P698	40987	1	0.000025	0	0	0.000000	4980.00	0.250000	0.000000
P699	40988	1	0.000025	0	0	0.000000	13800.00	1.496553	0.000000
P701	40990	1	0.000025	0	0	0.000000	4755.00	3.211360	0.164510
P704	40993	1	0.000025	0	0	0.000000	14025.00	1.299991	0.000000
P706	40995	1	0.000025	0	0	0.000000	24030.00	4.817176	0.215250
P707	40996	1	0.000025	0	0	0.000000	26100.00	4.964056	0.335772
P709	40998	1	0.000025	0	0	0.000000	17910.00	4.262974	0.000000
P716	41005	1	0.000025	0	0	0.000000	14040.00	2.254180	0.000000
P728	41017	1	0.000025	0	0	0.000000	13402.50	0.332333	0.000000
P729	41018	1	0.000025	18850	2	0.000050	13402.50	0.332333	0.000000
P730	41019	1	0.000025	0	0	0.000000	16642.50	2.183868	0.000000
P731	41020	1	0.000025	18703	2	0.000050	23392.50	2.744126	0.000000
P734	41023	1	0.000025	0	0	0.000000	2602.50	4.495637	0.771122
P735	41024	1	0.000025	40312	1	0.000025	13402.50	0.375048	0.000000
P742	41031	1	0.000025	40159	1	0.000025	13942.50	0.729693	0.000000
P746	41035	1	0.000025	0	0	0.000000	3952.50	4.305446	0.587486
P747	41036	1	0.000025	0	0	0.000000	15742.50	2.676532	0.000000
P750	41039	1	0.000025	18939	2	0.000050	4492.50	0.161799	0.000000
P751	41040	1	0.000025	0	0	0.000000	5752.50	0.412283	0.102742
P754	41043	1	0.000025	0	0	0.000000	15577.50	1.779857	0.000000
P756	41045	1	0.000025	0	0	0.000000	3877.50	3.551833	0.385760
P759	41048	1	0.000025	0	0	0.000000	15127.50	1.256066	0.000000
P764	41053	1	0.000025	0	0	0.000000	25117.50	3.771274	0.156960
P767	41056	1	0.000025	0	0	0.000000	15667.50	1.684606	0.000000
P769	41058	1	0.000025	0	0	0.000000	4432.50	0.000000	0.156327
P770	41059	1	0.000025	0	0	0.000000	16762.50	3.418487	0.000000
P771	41060	1	0.000025	0	0	0.000000	11272.50	4.474217	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P853	41142	1	0.000025	0	0	0.000000	8392.50	0.000000	0.058478
P854	41143	1	0.000025	0	0	0.000000	5617.50	0.000000	0.065809
P855	41144	1	0.000025	0	0	0.000000	4342.50	0.000000	0.058498
P856	41145	1	0.000025	0	0	0.000000	17212.50	0.000000	0.063367
P857	41146	1	0.000025	0	0	0.000000	5692.50	0.000000	0.065225
P858	41147	1	0.000025	0	0	0.000000	4672.50	0.000000	0.193348
P859	41148	1	0.000025	0	0	0.000000	5212.50	0.000000	0.181971
P860	41149	1	0.000025	0	0	0.000000	8392.50	0.000000	0.053146
P861	41150	1	0.000025	0	0	0.000000	15142.50	0.000000	0.059358
P862	41151	1	0.000025	0	0	0.000000	9892.50	0.000000	0.111123
P863	41152	1	0.000025	0	0	0.000000	966.75	0.000000	0.206798
P868	41938	1	0.000025	0	0	0.000000	17362.50	1.540107	0.000000
P872	41956	1	0.000025	0	0	0.000000	37305.00	3.070958	0.000000
P873	41963	1	0.000025	0	0	0.000000	37560.00	1.144152	0.341409
P880	42059	1	0.000025	0	0	0.000000	12612.00	0.343615	0.000000
P882	42061	1	0.000025	41370	1	0.000025	15852.00	2.262871	0.000000
P884	42063	1	0.000025	41341	1	0.000025	12612.00	0.379598	0.000000
P885	42064	1	0.000025	0	0	0.000000	12612.00	0.396454	0.000000
P888	42067	1	0.000025	41204	1	0.000025	12612.00	0.383889	0.000000
P889	42068	1	0.000025	41173	1	0.000025	12612.00	0.397407	0.000000
P893	42072	1	0.000025	41264	1	0.000025	13422.00	5.201031	0.000000
P899	42078	1	0.000025	41246	1	0.000025	13422.00	5.201031	0.000000
P901	42080	1	0.000025	0	0	0.000000	3162.00	7.518218	0.348688
P902	42081	1	0.000025	0	0	0.000000	3612.00	5.527149	0.540000
P903	42082	1	0.000025	41414	1	0.000025	6402.00	0.364266	0.000000
P906	42085	1	0.000025	0	0	0.000000	17652.00	4.214630	0.000000
P907	42086	1	0.000025	0	0	0.000000	3162.00	3.977149	0.540000
P908	42087	1	0.000025	0	0	0.000000	15222.00	0.904639	0.000000
P909	42088	1	0.000025	0	0	0.000000	6402.00	0.364266	0.000000
P910	42089	1	0.000025	0	0	0.000000	2352.00	4.186988	0.296093
P911	42090	1	0.000025	0	0	0.000000	13152.00	0.786903	0.000000
P912	42091	1	0.000025	0	0	0.000000	15222.00	0.921474	0.000000
P917	42096	1	0.000025	0	0	0.000000	3627.00	3.970970	0.540000
P918	42097	1	0.000025	0	0	0.000000	3627.00	3.970970	0.540000
P926	42105	1	0.000025	0	0	0.000000	16872.00	3.000474	0.000000
P927	42106	1	0.000025	0	0	0.000000	4107.00	4.533967	0.363604
P928	42107	1	0.000025	0	0	0.000000	2862.00	3.157299	0.037884
P931	42110	1	0.000025	0	0	0.000000	14112.00	0.536072	0.000000
P932	42111	1	0.000025	0	0	0.000000	14112.00	0.553294	0.000000
P933	42112	1	0.000025	41214	1	0.000025	2862.00	3.178353	0.110749
P947	42126	1	0.000025	0	0	0.000000	25902.00	4.980253	0.000000
P948	42127	1	0.000025	0	0	0.000000	14577.00	0.045370	0.000000
P957	42136	1	0.000025	0	0	0.000000	17352.00	2.438310	0.000000
P961	42140	1	0.000025	0	0	0.000000	14652.00	0.996968	0.000000
P962	42141	1	0.000025	41300	1	0.000025	3327.00	2.645184	0.346379
P964	42143	1	0.000025	19078	2	0.000050	3102.00	3.183355	0.109339
P966	42145	1	0.000025	0	0	0.000000	4902.00	7.919028	0.143139
P967	42146	1	0.000025	0	0	0.000000	4902.00	7.919028	0.143139
P968	42147	1	0.000025	0	0	0.000000	4902.00	7.919028	0.143139
P972	42151	1	0.000025	0	0	0.000000	16077.00	0.233774	0.000000
P977	42156	1	0.000025	0	0	0.000000	7362.00	0.115689	0.000000
P978	42157	1	0.000025	0	0	0.000000	14112.00	0.589077	0.000000
P980	42159	1	0.000025	0	0	0.000000	7002.00	4.973262	0.446458
P981	42160	1	0.000025	0	0	0.000000	14652.00	0.979952	0.000000
P983	42162	1	0.000025	0	0	0.000000	4662.00	1.490082	0.000000
P985	42164	1	0.000025	0	0	0.000000	16377.00	1.940893	0.000000
P987	42166	1	0.000025	0	0	0.000000	6057.00	3.445669	0.000000
P988	42167	1	0.000025	0	0	0.000000	25602.00	3.346123	0.232844
P990	42169	1	0.000025	41002	1	0.000025	3102.00	3.183355	0.109339
P991	42170	1	0.000025	0	0	0.000000	4362.00	3.711048	0.000000
P992	42171	1	0.000025	0	0	0.000000	15612.00	0.729861	0.000000
P1001	42180	1	0.000025	0	0	0.000000	28632.00	3.408040	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State Position	Occurrences	Occurrence (%)	State Position	Occurrences	Occurrence (%)		p.u.	p.u.
P140	13834	3	0.000075	13643	3	0.000075	3892.50	0.000000	0.052997
P146	13910	3	0.000075	41271	1	0.000025	3102.00	3.183355	0.109339
P147	13911	3	0.000075	41219	1	0.000025	3102.00	3.183355	0.109339
P148	13958	2	0.000050	0	0	0.000000	29520.00	9.249163	0.000000
P149	13998	2	0.000050	0	0	0.000000	29520.00	9.312202	0.176447
P150	14251	2	0.000050	0	0	0.000000	30060.00	9.679254	0.000000
P151	14259	2	0.000050	0	0	0.000000	30060.00	9.765302	0.099082
P152	14269	2	0.000050	19191	1	0.000025	30060.00	9.787872	0.433931
P153	14335	2	0.000050	19486	1	0.000025	30060.00	9.679254	0.000000
P155	14456	2	0.000050	0	0	0.000000	29985.00	8.792065	0.085404
P157	14569	2	0.000050	0	0	0.000000	29985.00	8.666728	0.000000
P158	14760	2	0.000050	0	0	0.000000	30795.00	7.254903	0.000000
P159	14767	2	0.000050	0	0	0.000000	30525.00	9.182728	0.000000
P160	14803	2	0.000050	0	0	0.000000	30525.00	9.182728	0.000000
P161	14870	2	0.000050	21597	1	0.000025	6435.00	0.122193	0.515387
P162	14871	2	0.000050	0	0	0.000000	6435.00	0.121595	0.528714
P163	14872	2	0.000050	0	0	0.000000	7245.00	0.104617	0.531847
P164	14873	2	0.000050	21655	1	0.000025	6975.00	0.168612	0.483151
P165	14900	2	0.000050	0	0	0.000000	26040.00	6.591476	0.350415
P166	14978	2	0.000050	21972	1	0.000025	6420.00	2.551203	0.734550
P167	15049	2	0.000050	21820	1	0.000025	29280.00	8.457936	0.000000
P168	15112	2	0.000050	14544	2	0.000050	6420.00	2.551203	0.734550
P169	15182	2	0.000050	8310	5	0.000125	29760.00	7.898880	0.000000
P170	15183	2	0.000050	11145	3	0.000075	29760.00	7.898880	0.000000
P171	15189	2	0.000050	0	0	0.000000	29760.00	7.981832	0.133854
P172	15208	2	0.000050	0	0	0.000000	26520.00	6.091396	1.228630
P173	15413	2	0.000050	0	0	0.000000	30225.00	7.411881	0.000000
P174	15419	2	0.000050	0	0	0.000000	31485.00	8.993900	0.395663
P175	15620	2	0.000050	0	0	0.000000	29760.00	7.898880	0.000000
P176	15621	2	0.000050	23764	1	0.000025	29760.00	7.898880	0.000000
P177	15631	2	0.000050	14735	2	0.000050	29760.00	7.981832	0.133854
P178	15641	2	0.000050	0	0	0.000000	29760.00	7.969190	0.221632
P179	15735	2	0.000050	0	0	0.000000	31560.00	9.976605	0.441867
P182	15810	2	0.000050	24086	1	0.000025	30225.00	7.411881	0.000000
P183	16165	2	0.000050	0	0	0.000000	29280.00	8.562694	0.461366
P184	16166	2	0.000050	0	0	0.000000	26040.00	6.590767	0.348637
P185	16230	2	0.000050	25652	1	0.000025	26505.00	6.125154	0.845593
P186	16303	2	0.000050	26129	1	0.000025	29520.00	7.208093	0.000000
P187	16346	2	0.000050	15502	2	0.000050	29520.00	7.208093	0.000000
P188	16406	2	0.000050	0	0	0.000000	26040.00	6.586066	0.174217
P189	16671	2	0.000050	27582	1	0.000025	29760.00	7.898957	0.000000
P191	16682	2	0.000050	0	0	0.000000	29760.00	7.981699	0.134225
P192	16692	2	0.000050	27648	1	0.000025	29760.00	8.003736	0.450664
P193	16840	2	0.000050	0	0	0.000000	11400.00	4.456827	0.139847
P194	16841	2	0.000050	0	0	0.000000	18150.00	4.882825	0.191119
P195	16842	2	0.000050	0	0	0.000000	18150.00	4.899857	0.192143
P196	16855	2	0.000050	0	0	0.000000	31485.00	8.976537	0.087333
P197	16935	2	0.000050	28412	1	0.000025	30225.00	7.328216	0.000000
P198	17083	2	0.000050	0	0	0.000000	31260.00	8.103383	0.000000
P199	17088	2	0.000050	0	0	0.000000	31260.00	8.181092	0.127558
P202	17473	2	0.000050	30732	1	0.000025	26520.00	6.091316	1.229154
P203	17477	2	0.000050	0	0	0.000000	28590.00	6.149472	0.245956
P204	17553	2	0.000050	0	0	0.000000	31560.00	9.966702	0.563731
P205	17582	2	0.000050	0	0	0.000000	31560.00	9.964548	0.092462
P206	17609	2	0.000050	31029	1	0.000025	30225.00	7.328216	0.000000
P207	17696	2	0.000050	31322	1	0.000025	30225.00	7.328216	0.000000
P208	17836	2	0.000050	0	0	0.000000	30450.00	7.041844	0.000000
P209	17923	2	0.000050	0	0	0.000000	8175.00	0.124499	0.520228
P210	18467	2	0.000050	0	0	0.000000	22541.25	2.851848	0.349749
P212	18703	2	0.000050	36743	1	0.000025	22574.25	2.831496	0.137647
P213	18805	2	0.000050	0	0	0.000000	45780.00	6.466665	0.000000
P214	19003	2	0.000050	0	0	0.000000	45810.00	3.133631	0.000000
P215	19011	2	0.000050	0	0	0.000000	44280.00	6.187577	0.000000
P220	19302	2	0.000050	40632	1	0.000025	1755.00	2.884545	0.459485
P221	19303	2	0.000050	0	0	0.000000	12780.00	0.742986	0.000000
P225	19307	2	0.000050	39958	1	0.000025	16642.50	2.165265	0.000000
P227	19309	2	0.000050	18822	2	0.000050	13942.50	0.729693	0.000000
P228	19310	2	0.000050	0	0	0.000000	13942.50	0.745844	0.000000
P229	19311	2	0.000050	19047	2	0.000050	1912.50	0.000000	0.142712
P230	19312	2	0.000050	0	0	0.000000	6892.50	0.000000	0.008874
P231	19313	2	0.000050	40171	1	0.000025	13642.50	0.000000	0.015731
P232	19314	2	0.000050	40283	1	0.000025	4117.50	0.000000	0.015767
P233	19315	2	0.000050	0	0	0.000000	13642.50	0.000000	0.015731
P234	19316	2	0.000050	0	0	0.000000	4462.50	0.000000	0.009754
P235	19317	2	0.000050	18823	2	0.000050	4192.50	0.000000	0.015561
P236	19318	2	0.000050	0	0	0.000000	4117.50	0.000000	0.015767
P237	19319	2	0.000050	0	0	0.000000	8392.50	0.000000	0.064219
P238	19320	2	0.000050	18782	2	0.000050	13642.50	0.000000	0.010511
P239	19321	2	0.000050	39861	1	0.000025	3892.50	0.000000	0.058332
P240	19322	2	0.000050	0	0	0.000000	15442.50	0.934808	0.000000
P241	19323	2	0.00005	0	0	0.000000	15367.50	0.087471	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P340	21875	1	0.000025	0	0	0.000000	27210.00	6.433282	0.707606
P341	21971	1	0.000025	0	0	0.000000	27210.00	8.666728	0.000000
P342	21972	1	0.000025	20705	1	0.000025	27210.00	8.666728	0.000000
P343	21973	1	0.000025	0	0	0.000000	27210.00	9.151027	0.000000
P344	22010	1	0.000025	0	0	0.000000	27210.00	6.885256	1.133144
P345	22060	1	0.000025	0	0	0.000000	27210.00	8.799704	0.000000
P346	22125	1	0.000025	0	0	0.000000	27210.00	5.577105	0.526181
P347	22202	1	0.000025	0	0	0.000000	27210.00	9.560745	0.000000
P348	22213	1	0.000025	0	0	0.000000	27210.00	7.815690	0.628278
P349	22340	1	0.000025	0	0	0.000000	27210.00	5.670830	0.293701
P350	22341	1	0.000025	0	0	0.000000	27210.00	5.770143	0.403896
P351	22349	1	0.000025	0	0	0.000000	27210.00	6.217760	0.000000
P352	22359	1	0.000025	0	0	0.000000	27210.00	10.291287	0.132509
P353	22423	1	0.000025	0	0	0.000000	27210.00	10.070734	0.000000
P354	22424	1	0.000025	0	0	0.000000	27210.00	10.552140	0.000000
P355	22454	1	0.000025	0	0	0.000000	27210.00	8.211021	0.000000
P356	22455	1	0.000025	0	0	0.000000	27210.00	8.606004	0.000000
P357	22459	1	0.000025	0	0	0.000000	27210.00	6.379186	0.385380
P358	22520	1	0.000025	0	0	0.000000	27210.00	0.104713	0.531259
P359	22521	1	0.000025	21677	1	0.000025	27210.00	0.119202	0.528172
P360	22522	1	0.000025	0	0	0.000000	27210.00	3.301222	0.000000
P361	22523	1	0.000025	0	0	0.000000	27210.00	3.315853	0.000000
P362	22524	1	0.000025	0	0	0.000000	27210.00	0.104617	0.531847
P363	22525	1	0.000025	0	0	0.000000	27210.00	0.123139	0.517289
P364	22526	1	0.000025	0	0	0.000000	27210.00	1.513766	0.000000
P365	22527	1	0.000025	0	0	0.000000	27210.00	6.777297	0.000000
P366	22528	1	0.000025	0	0	0.000000	27210.00	0.264752	0.391319
P367	22529	1	0.000025	0	0	0.000000	27210.00	0.264752	0.391319
P368	22563	1	0.000025	0	0	0.000000	27210.00	8.457936	0.000000
P369	22578	1	0.000025	0	0	0.000000	27210.00	5.592303	0.355930
P370	22593	1	0.000025	0	0	0.000000	27210.00	8.563665	0.460269
P371	22594	1	0.000025	0	0	0.000000	27210.00	10.086681	0.181629
P372	22745	1	0.000025	0	0	0.000000	27210.00	8.874223	0.000000
P373	22779	1	0.000025	0	0	0.000000	27210.00	10.944150	0.000000
P374	22840	1	0.000025	0	0	0.000000	27210.00	13.980924	0.920898
P375	22858	1	0.000025	0	0	0.000000	27210.00	6.125433	0.844053
P376	22904	1	0.000025	0	0	0.000000	27210.00	6.457349	0.000000
P377	22932	1	0.000025	0	0	0.000000	27210.00	9.940696	0.000000
P378	22936	1	0.000025	0	0	0.000000	27210.00	9.940696	0.000000
P379	22946	1	0.000025	0	0	0.000000	27210.00	11.401535	0.900000
P380	22969	1	0.000025	0	0	0.000000	27210.00	7.974844	0.000000
P381	22975	1	0.000025	0	0	0.000000	27210.00	6.105316	0.400241
P382	22978	1	0.000025	0	0	0.000000	27210.00	9.554477	0.381459
P383	23033	1	0.000025	0	0	0.000000	27210.00	8.968011	0.000000
P384	23043	1	0.000025	0	0	0.000000	27210.00	2.282524	0.000000
P385	23074	1	0.000025	0	0	0.000000	27210.00	8.457936	0.000000
P386	23084	1	0.000025	0	0	0.000000	27210.00	8.521945	0.039205
P387	23085	1	0.000025	0	0	0.000000	27210.00	6.586775	0.176015
P388	23086	1	0.000025	0	0	0.000000	27210.00	6.586775	0.176015
P389	23097	1	0.000025	21864	1	0.000025	27210.00	8.563665	0.460269
P390	23098	1	0.000025	0	0	0.000000	27210.00	5.628606	0.820184
P391	23113	1	0.000025	0	0	0.000000	27210.00	7.045014	0.000000
P392	23214	1	0.000025	0	0	0.000000	27210.00	8.537842	0.066469
P393	23325	1	0.000025	0	0	0.000000	27210.00	5.010032	0.187450
P394	23336	1	0.000025	0	0	0.000000	27210.00	7.974844	0.000000
P395	23350	1	0.000025	0	0	0.000000	27210.00	6.125433	0.844053
P396	23411	1	0.000025	22050	1	0.000025	27210.00	7.974844	0.000000
P397	23416	1	0.000025	0	0	0.000000	27210.00	6.125433	0.844053
P398	23500	1	0.000025	0	0	0.000000	27210.00	6.105316	0.400241
P399	23559	1	0.000025	0	0	0.000000	27210.00	0.130934	0.524682
P400	23566	1	0.000025	0	0	0.000000	27210.00	7.781791	0.000000
P401	23653	1	0.000025	0	0	0.000000	27210.00	6.846032	0.000000
P402	23655	1	0.000025	0	0	0.000000	27210.00	6.846032	0.000000
P403	23698	1	0.000025	22425	1	0.000025	27210.00	7.969190	0.221632
P404	23700	1	0.000025	0	0	0.000000	27210.00	6.572779	0.650013
P405	23760	1	0.000025	0	0	0.000000	27210.00	8.021152	0.000000
P406	23936	1	0.000025	0	0	0.000000	27210.00	9.976605	0.441867
P407	24009	1	0.000025	0	0	0.000000	27210.00	9.849047	0.000000
P408	24025	1	0.000025	14298	2	0.000050	27210.00	9.964711	0.092020
P409	24186	1	0.000025	0	0	0.000000	27210.00	11.816866	0.000000
P410	24218	1	0.000025	0	0	0.000000	27210.00	4.456101	0.131393
P411	24384	1	0.000025	0	0	0.000000	27210.00	8.976694	0.086912
P412	24520	1	0.000025	0	0	0.000000	27210.00	3.324900	1.204772
P413	24604	1	0.000025	0	0	0.000000	27210.00	9.377619	0.000000
P414	24676	1	0.000025	0	0	0.000000	27210.00	6.573378	0.380611
P415	24713	1	0.000025	0	0	0.000000	27210.00	6.036090	0.228901
P416	24714	1	0.000025	0	0	0.000000	27210.00	8.027692	0.124111
P417	24715	1	0.000025	0	0	0.000000	27210.00	5.409718	0.000000
P418	24716	1	0.000025	0	0	0.000000	27210.00	1.650984	0.000000
P419	24731	1	0.000025	23402	1	0.000025	27210.00	7.208763	0.000000
P420	24788	1	0.000025	0	0	0.000000	27210.00	9.072107	0.000000

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P507	29699	1	0.000025	0	0	0.000000	32745.00	10.480447	0.684403
P508	29715	1	0.000025	0	0	0.000000	29055.00	5.635576	0.351387
P509	29768	1	0.000025	0	0	0.000000	30495.00	9.439457	0.104569
P510	29983	1	0.000025	0	0	0.000000	28245.00	7.056919	0.312468
P511	29984	1	0.000025	0	0	0.000000	28695.00	7.495838	0.041271
P512	29994	1	0.000025	0	0	0.000000	28245.00	7.018553	0.331328
P513	30043	1	0.000025	0	0	0.000000	33735.00	11.401885	0.000000
P514	30060	1	0.000025	0	0	0.000000	32025.00	9.377693	0.000000
P516	30286	1	0.000025	0	0	0.000000	28455.00	6.792725	0.275276
P517	30300	1	0.000025	0	0	0.000000	28470.00	5.850014	0.108881
P519	30499	1	0.000025	0	0	0.000000	31260.00	8.103383	0.000000
P520	30520	1	0.000025	0	0	0.000000	28020.00	6.280949	0.819780
P521	30521	1	0.000025	0	0	0.000000	28020.00	6.280949	0.819780
P522	30716	1	0.000025	0	0	0.000000	9660.00	12.581876	0.900000
P523	30738	1	0.000025	0	0	0.000000	29745.00	7.265829	1.003054
P524	30884	1	0.000025	0	0	0.000000	8175.00	0.124499	0.520228
P525	30894	1	0.000025	0	0	0.000000	31020.00	7.405739	0.000000
P526	30993	1	0.000025	0	0	0.000000	31260.00	8.103383	0.000000
P527	31123	1	0.000025	0	0	0.000000	32250.00	8.988902	0.000000
P528	31164	1	0.000025	0	0	0.000000	29820.00	8.176294	0.064601
P529	31269	1	0.000025	0	0	0.000000	30285.00	7.650008	0.341261
P531	31307	1	0.000025	0	0	0.000000	28485.00	5.753400	0.838417
P532	31348	1	0.000025	0	0	0.000000	8175.00	0.124499	0.520228
P533	31349	1	0.000025	0	0	0.000000	12045.00	0.605924	0.155138
P535	31570	1	0.000025	12230	3	0.000075	29520.00	7.208451	0.000000
P536	31705	1	0.000025	0	0	0.000000	7695.00	0.139530	0.524804
P537	31848	1	0.000025	0	0	0.000000	30780.00	8.746014	0.110847
P538	31854	1	0.000025	0	0	0.000000	27540.00	6.831233	1.039452
P539	31886	1	0.000025	0	0	0.000000	31590.00	7.342519	0.000000
P540	31988	1	0.000025	0	0	0.000000	30540.00	7.979383	0.000000
P541	32064	1	0.000025	0	0	0.000000	31020.00	7.318639	0.000000
P542	32166	1	0.000025	0	0	0.000000	29760.00	7.898957	0.000000
P543	32375	1	0.000025	0	0	0.000000	32280.00	8.605844	0.382634
P544	32520	1	0.000025	0	0	0.000000	28320.00	8.017973	0.881644
P545	32608	1	0.000025	0	0	0.000000	31560.00	9.874474	0.000000
P546	32717	1	0.000025	0	0	0.000000	19410.00	6.409543	0.296292
P547	32740	1	0.000025	0	0	0.000000	31485.00	8.976537	0.087333
P548	32741	1	0.000025	0	0	0.000000	28245.00	7.056919	0.312468
P549	32762	1	0.000025	0	0	0.000000	32295.00	7.543878	0.000000
P550	32830	1	0.000025	0	0	0.000000	33285.00	10.837326	0.000000
P551	32875	1	0.000025	0	0	0.000000	30675.00	7.809705	0.000000
P552	33187	1	0.000025	0	0	0.000000	30510.00	8.350906	0.000000
P553	33218	1	0.000025	0	0	0.000000	7935.00	0.127270	0.516541
P555	33495	1	0.000025	0	0	0.000000	28005.00	6.267395	0.279965
P556	33574	1	0.000025	0	0	0.000000	30450.00	7.041844	0.000000
P557	33576	1	0.000025	0	0	0.000000	30450.00	7.041844	0.000000
P559	33755	1	0.000025	0	0	0.000000	33060.00	10.176209	0.131929
P560	33843	1	0.000025	0	0	0.000000	28485.00	5.739132	0.420551
P561	34027	1	0.000025	0	0	0.000000	29505.00	6.525720	0.762003
P562	34033	1	0.000025	0	0	0.000000	29505.00	6.372666	0.000000
P563	34038	1	0.000025	0	0	0.000000	29265.00	5.787324	0.172249
P564	34075	1	0.000025	0	0	0.000000	31260.00	8.181092	0.127558
P566	34317	1	0.000025	0	0	0.000000	28485.00	5.753400	0.838417
P567	34410	1	0.000025	17141	2	0.000050	8175.00	0.124499	0.520228
P568	34454	1	0.000025	0	0	0.000000	31020.00	7.405739	0.000000
P569	34755	1	0.000025	0	0	0.000000	28455.00	6.792411	0.275355
P570	34927	1	0.000025	0	0	0.000000	27990.00	7.276907	0.218014
P571	34929	1	0.000025	0	0	0.000000	27540.00	6.831233	1.039452
P572	35191	1	0.000025	0	0	0.000000	29505.00	6.372192	0.000000
P573	35309	1	0.000025	0	0	0.000000	28020.00	6.290840	1.209888
P574	35310	1	0.000025	0	0	0.000000	29280.00	7.809295	1.007864
P575	35485	1	0.000025	0	0	0.000000	21720.00	5.216389	0.175032
P576	35530	1	0.000025	33173	1	0.000025	31725.00	7.524056	0.000000
P577	35645	1	0.000025	0	0	0.000000	8175.00	0.106030	0.541228
P578	35661	1	0.000025	0	0	0.000000	33090.00	7.538771	0.000000
P579	35746	1	0.000025	0	0	0.000000	31950.00	7.238287	0.000000
P580	35881	1	0.000025	0	0	0.000000	31950.00	7.238287	0.000000
P581	36352	1	0.000025	0	0	0.000000	26111.25	3.164648	0.368211
P582	37059	1	0.000025	0	0	0.000000	25551.00	5.222550	0.000000
P586	37203	1	0.000025	0	0	0.000000	4071.00	2.524081	0.000000
P589	37206	1	0.000025	0	0	0.000000	2346.00	5.313743	0.000000
P593	37218	1	0.000025	0	0	0.000000	3291.00	0.000000	0.118596
P594	37219	1	0.000025	36455	1	0.000025	3291.00	0.000000	0.118596
P595	37229	1	0.000025	0	0	0.000000	3291.00	0.000000	0.118596
P598	37233	1	0.000025	0	0	0.000000	12336.00	5.739777	0.000000
P608	37953	1	0.000025	0	0	0.000000	16274.25	2.706769	0.000000
P609	37971	1	0.000025	0	0	0.000000	24374.25	4.778274	0.012606
P610	37978	1	0.000025	0	0	0.000000	17549.25	3.195813	0.000000
P611	38020	1	0.000025	0	0	0.000000	24854.25	5.080281	0.000000
P612	38025	1	0.000025	0	0	0.000000	25334.25	4.486681	0.000000
P613	38148	1	0.000025	0	0	0.000000	22574.25	2.856768	0.030083

ID	Before Investment		State Probability	After Investment		State Probability	Cost (m.u.)	Active Load Curtailment	Reactive Load Curtailment
	State	Occurrences	Occurrence (%)	State	Occurrences	Occurrence (%)		p.u.	p.u.
P772	41061	1	0.000025	0	0	0.000000	14887.50	0.580383	0.000000
P773	41062	1	0.000025	0	0	0.000000	3637.50	0.000000	0.151323
P774	41063	1	0.000025	0	0	0.000000	3652.50	0.000000	0.008874
P775	41064	1	0.000025	0	0	0.000000	3652.50	0.000000	0.008874
P776	41065	1	0.000025	0	0	0.000000	2842.50	0.000000	0.009039
P777	41066	1	0.000025	0	0	0.000000	2842.50	0.000000	0.009039
P778	41067	1	0.000025	0	0	0.000000	2842.50	0.000000	0.009039
P779	41068	1	0.000025	0	0	0.000000	4102.50	0.000000	0.009039
P780	41069	1	0.000025	0	0	0.000000	14902.50	0.511489	0.000000
P781	41070	1	0.000025	0	0	0.000000	3652.50	0.000000	0.018148
P782	41071	1	0.000025	0	0	0.000000	4462.50	0.000000	0.009754
P783	41072	1	0.000025	0	0	0.000000	15712.50	0.000000	0.016684
P784	41073	1	0.000025	0	0	0.000000	27412.50	3.596762	0.151272
P785	41074	1	0.000025	40092	1	0.000025	4192.50	0.000000	0.015561
P786	41075	1	0.000025	0	0	0.000000	4117.50	0.000000	0.015767
P787	41076	1	0.000025	0	0	0.000000	15367.50	0.101971	0.000000
P788	41077	1	0.000025	18721	2	0.000050	3652.50	0.000000	0.008874
P789	41078	1	0.000025	0	0	0.000000	2842.50	0.000000	0.009039
P790	41079	1	0.000025	0	0	0.000000	7342.50	3.984637	0.245121
P791	41080	1	0.000025	0	0	0.000000	18142.50	2.359755	0.000000
P792	41081	1	0.000025	0	0	0.000000	14092.50	0.000000	0.010870
P793	41082	1	0.000025	0	0	0.000000	4462.50	0.000000	0.009754
P794	41083	1	0.000025	0	0	0.000000	4462.50	0.000000	0.009754
P795	41084	1	0.000025	0	0	0.000000	20212.50	2.496434	0.000000
P796	41085	1	0.000025	0	0	0.000000	4462.50	0.000000	0.009754
P797	41086	1	0.000025	0	0	0.000000	5452.50	0.000000	0.013132
P798	41087	1	0.000025	0	0	0.000000	4642.50	0.000000	0.017398
P799	41088	1	0.000025	0	0	0.000000	4192.50	0.000000	0.015561
P800	41089	1	0.000025	0	0	0.000000	5452.50	0.000000	0.013132
P801	41090	1	0.000025	0	0	0.000000	15367.50	0.088418	0.000000
P802	41091	1	0.000025	0	0	0.000000	7912.50	0.000000	0.208338
P803	41092	1	0.000025	0	0	0.000000	4342.50	0.000000	0.064239
P804	41093	1	0.000025	0	0	0.000000	15142.50	0.000000	0.065256
P805	41094	1	0.000025	0	0	0.000000	5152.50	0.000000	0.076631
P806	41095	1	0.000025	0	0	0.000000	7672.50	0.633844	0.000000
P807	41096	1	0.000025	0	0	0.000000	3637.50	0.000000	0.131665
P808	41097	1	0.000025	0	0	0.000000	6412.50	0.000000	0.124842
P809	41098	1	0.000025	0	0	0.000000	3172.50	0.000000	0.123157
P810	41099	1	0.000025	40518	1	0.000025	3172.50	0.000000	0.123157
P811	41100	1	0.000025	0	0	0.000000	14422.50	1.035226	0.000000
P812	41101	1	0.000025	0	0	0.000000	13162.50	0.000000	0.128348
P813	41102	1	0.000025	0	0	0.000000	6232.50	0.677539	0.000000
P814	41103	1	0.000025	0	0	0.000000	3637.50	0.000000	0.131665
P815	41104	1	0.000025	0	0	0.000000	4672.50	0.000000	0.184216
P816	41105	1	0.000025	0	0	0.000000	5137.50	0.000000	0.192265
P817	41106	1	0.000025	0	0	0.000000	3412.50	0.000000	0.184216
P818	41107	1	0.000025	0	0	0.000000	3652.50	0.000000	0.003501
P819	41108	1	0.000025	0	0	0.000000	14902.50	0.511155	0.000000
P820	41109	1	0.000025	0	0	0.000000	14092.50	0.000000	0.011134
P821	41110	1	0.000025	0	0	0.000000	3652.50	0.000000	0.012776
P822	41111	1	0.000025	0	0	0.000000	15712.50	0.000000	0.011176
P823	41112	1	0.000025	0	0	0.000000	15712.50	0.000000	0.011308
P824	41113	1	0.000025	0	0	0.000000	6712.50	0.196246	0.000000
P825	41114	1	0.000025	0	0	0.000000	4642.50	0.000000	0.010598
P826	41115	1	0.000025	0	0	0.000000	4642.50	0.000000	0.010598
P827	41116	1	0.000025	0	0	0.000000	6262.50	0.000000	0.010908
P828	41117	1	0.000025	0	0	0.000000	5917.50	0.000000	0.014845
P829	41118	1	0.000025	0	0	0.000000	7642.50	0.242231	0.000000
P830	41119	1	0.000025	0	0	0.000000	14662.50	0.000000	0.202644
P831	41120	1	0.000025	40046	1	0.000025	3892.50	0.000000	0.058332
P832	41121	1	0.000025	0	0	0.000000	5617.50	0.000000	0.065809
P833	41122	1	0.000025	0	0	0.000000	15142.50	0.000000	0.062576
P834	41123	1	0.000025	0	0	0.000000	5692.50	0.000000	0.065225
P835	41124	1	0.000025	0	0	0.000000	3412.50	0.000000	0.179021
P836	41125	1	0.000025	0	0	0.000000	3412.50	0.000000	0.179021
P837	41126	1	0.000025	40209	1	0.000025	6892.50	0.000000	0.003501
P838	41127	1	0.000025	0	0	0.000000	3652.50	0.000000	0.003501
P839	41128	1	0.000025	0	0	0.000000	4912.50	0.000000	0.003501
P840	41129	1	0.000025	0	0	0.000000	14902.50	0.511155	0.000000
P841	41130	1	0.000025	40393	1	0.000025	3652.50	0.000000	0.015702
P842	41131	1	0.000025	0	0	0.000000	4462.50	0.000000	0.004381
P843	41132	1	0.000025	0	0	0.000000	8962.50	0.000000	0.004381
P844	41133	1	0.000025	0	0	0.000000	4462.50	0.000000	0.004381
P845	41134	1	0.000025	39895	1	0.000025	5722.50	0.000000	0.016701
P846	41135	1	0.000025	0	0	0.000000	4192.50	0.000000	0.010165
P847	41136	1	0.000025	0	0	0.000000	4192.50	0.000000	0.010165
P848	41137	1	0.000025	0	0	0.000000	5452.50	0.000000	0.016066
P849	41138	1	0.000025	0	0	0.000000	26692.50	4.929315	0.150575
P850	41139	1	0.000025	0	0	0.000000	4117.50	0.000000	0.010372
P851	41140	1	0.000025	0	0	0.000000	4117.50	0.000000	0.010372
P852	41141	1	0.000025	0	0	0.000000	4672.50	0.000000	0.198502