DYNAMIC LOAD FLOW OF CIGRE MV/LV DISTRIBUTION BENCHMARK MODEL

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Certificate

We accept the work contained in this report as a confirmation to the required standard for the partial fulfilment of the degree of MS (EE).

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DEDICATION

Dedicated to my devoted parents.

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ABSTRACT

Variations in load and renewable DGs brings overall fluctuations in distribution system as a result stability of system disturbs in the form of system losses enrichment and reduction in bus voltage profiles. The system stability can be strengthen by allocating DGs having suitable size in the system but in a literature the DGs are allocated at fixed loads and constant output power from generators while in practical these values change with time during a whole day. Robust solution is calculated for a whole day on the basis of min-max regret concept by making different scenarios while the test system in current paper is "CIGRE MV bench mark model" carrying variable residential and commercial loads at different buses with addition of different DGs having variant output powers at different time instants. Variation in load and renewable power are considered in the form of different scenarios, so as 24 scenarios are considered while each scenario represents specific hour of the day. Optimum size and location of DGs are obtained for each scenario on the basis of minimum value of Multi-Objective-Index (MO) using by newly formed algorithm BRO. The robust solution of DGs are obtained among all scenarios to minimize active power losses, reactive power losses and voltage deviation index as a combine MO for a whole day. The results are also taken with GA and APSO algorithms while the results show that remarkable reduction arises in system losses and improvement in bus voltages at each time instant of day. The test system is 14 bus system.

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ABBREVIATIONS

LFA	Load Flow Analysis
ABC	Artificial Bee Colony
APL	Active Power Losses
APSO	Accelerated Particle Swarm Optimization
DG	Distributed Generators
BRO	Battle Royal Optimisation
GA	Genetic Algorithm
NRLF	Newton Raphson Load Flow
MO	Multi Objective Function
PSO	Particle Swarm Optimisation
RPL	Reactive Power Loss
PF	Power Factor
PUBG	Player Unknown's Battle Grounds
VD	Voltage Deviation Index
MV	Medium Voltage
LV	Low Voltage
PV	Photo Voltaic
KW	Kilo Watt
KVA	Kilo Volt Ampere

Chapter 1

Introduction

CHAPTER 1. INTRODUCTION

Electricity and technology brings remarkable changes in daily routine of human life. The generation of Electricity and then dispatched to people colonies is the part of Power systems. In power systems, the stability is not consistent throughout and effected by many reasons, in which variations in load and its types are one of them. Power system stability can be strengthen by placing DGs at distribution level which are of both types i.e. conventional and renewable.

1.1. Dynamic Load Flow Analysis

Load Flow analysis (LFA) is the organise way for calculating system branch losses, bus voltage profiles and their angles, net powers at different buses, power flow across generators and loads providing these details for investigating system stability under static condition of the system [1]. LFA will be discussed in chapter 4 in detail. The static operation results obtained through LFA is essential for DG planning in the distribution system. In current research, the load has variation at each time step of the day while at the same time power extracts from renewable resources have fluctuations due to dynamic nature of renewable resources. As a results, at each time step, LFA has to carry out to check distribution system capability for placement of DGs.

1.2. Distributed Generator (DG)

Generators used at distribution level are smaller in size than the large power plants producing electricity while these power plants provide electricity in bulks which is transmitted to far of locations, which results in huge power losses. The way of bringing down power losses is to place generators at distribution level so as to reduce the gap between generation and consumer as a results line losses decreases.

1.2.1. Conventional DGs

The conventional DGs use fuel such as coal, diesel, gas and oil for generation of electricity while these type of DGs are providing stable output power but these are expensive and environment unfriendly especially for human being as generating electricity from these type of sources emit

harmful gases which causes damage to ozone layer with addition of air pollution and their resources are reducing with time.

1.2.2. Renewable DGs

The renewable DGs are cheap and clean sources of energy But renewable resources such as solar irradiance and wind are not consistent throughout as these are depending upon sun light and wind speed which are continuously changes with time and weather condition.

1.3. Background/Overview

As power system stability is effected by variation of load and its types. As LFA is carried out for determining stable operations. Researchers are mainly focusing on DGs placement and sizing to stabilize power systems through many ways like minimizing system losses , increasing system sensitivity , stabilizing system frequencies, improvement in bus voltage profile and like many other factors are analyzed which will be discussed in literature review. LFA is executed at different types of loads while in some cases loads are estimated on the basis of stochastic probability for DG planning to achieve system balancing. In each case, they utilize static nature of load and consider DGs at static point while in this thesis variation load is considered which fluctuates at different time of day. Same as load, variations in output power of renewable DGs are also considered having different value for each time step of a whole day. So chalk out of DGs in the Distribution system are take place at each hour on the basis of LFA at each time so 24 times DGs planning is performed and selection is accomplished on the basis of minimum active and reactive power losses and maximum bus voltage profiles for overall time in a day.

1.4. Thesis Objectives

The Thesis have following objectives

- Implementation of new algorithm BRO on DG planning and sizing
- Performing DG planning and sizing at each hour.
- Active power losses minimization
- Reactive power losses minimization

- Bus voltage profiles improvement
- Selection of Robust combinations of DGs for whole day having minimum losses and maximum bus profile voltages improvement
- Comparing results taken with BRO with the results taken with GA and APSO.

1.5. Thesis Organization

Thesis is organized in following way

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Related Topics and proposed Algorithms

Chapter 4: Methodology

Chapter 5: Evaluation and Results

Chapter 6: Conclusion and Future work

Chapter 2

Literature Review

CHAPTER 2. LITERATURE REVIEW

The world is moving towards clean and green energy i.e. renewable energy but it has certain drawbacks like safety and reliability while placing renewable DGs in the system. The DGs are optimally placed using optimally locator index on the basis of sensitivity of power loss. The Sizes of DGs are optimally calculated by Kalman filter algorithm while having few samples of load data [2].

In [3] PV based single DG optimum size is obtained and calculated generation of power for day time in the presence of probabilistic generation and multiple time-based voltage-dependent-load models. The multi-objective-index is used with the PSO algorithm for optimum value at average load on the 33 and 69 IEEE distribution test systems. The results are compared with relevant study of DG allocation while position of DG in the system is same while the size of DG and average multi-objective-index is little different. The active power loss, reactive power loss and bus voltage deviation are the combine objective values.

While in [4] wind based single DG is placed with suitable size by PSO algorithm to minimize multi-objective-function which is combination of active and reactive power loss, voltage deviation and voltage stability indexes. The multiple time-based voltage-dependent-load models are used in the presence of probabilistic generation and calculated output power of DG at each time of day relevant to speed of wind at that time instant. Energy loss minimization is 56%, 40%, 45%, 44% and 38% in the presence of commercial, constant, industrial, mixed and residential load respectively in 33 bus system while 53%, 43%, 44%, 42% and 40% energy loss reduction in 69 bus system in the same order. The method is applied on the 33 and 69 IEEE distribution test systems.

DGs placing in the system carry significant instalment and operational costs which is minimized along with whole system power losses and average voltages drop using optimal placement and sizing of DGs in the system using multi-objective-function with the help of ABC algorithm at static load [5]. The procedure is implemented on CIGRE benchmark model and 33 and 69 IEEE distribution test systems with ABC algorithm and compare results with GA algorithm.

In [6] DG is placed on the basis of loss-sensitivity-factor while sizing of DG is obtained using invasive-weed-optimization algorithm in the presence of different types of load while objective is to minimize total system losses, voltage-deviation-index and operational cost in the form of combine objective function. The method can be applicable and give better results even at different power factors on IEEE 33 and 69 bus system. Significant improvement in sense of worst bus voltage and have minimum operation cost as compare with previous methods.

System performance is improved by minimizing system sensitivity, active and reactive losses and improving system reliability and voltage profile by the instalment of DGs with GA and PSO at most favourable position and size in the system with the presence of different load models. The objectives are minimized in the form of combine objective. Paper also presents set of various new load-models equations. Method is implemented on 33, 69 and 54 bus systems [7]. The results shows that maximum 94.75 and 93.06 percent reduction as compare to literature using PSO and GA algorithm respectively while 89.55 and 88.64 percent maximum reactive loss minimization using PSO and GA respectively.

In [8] PSO-algorithm along with Encoded-Markov-cut-set algorithm and LFS is used for the allocation and sizing of DGs at four cases along with suitable power factor in Roy-Billinton-test system for minimizing average-interruption-frequency-index, average-interruption-duration-index and active losses and enhancement in bus voltage profiles in the form of combine objective function. Four types are considered for placement of DG i.e. supplying active power at unity pf, supplying active power and absorbing of reactive power at lagging pf, supplying active and reactive power at leading pf and operating DG at either leading or lagging pf. The stochastic behavior of renewable energy and load is considered while results are compared for both meshed and radial systems.

[9]Capacitor are placed in addition to Wind power based DGs in the distribution system on the basis of least value of combine objective function through modified PSO while the objectives are to minimize real and reactive power losses, improvement in voltage profile and minimization gas emission of the distribution system. Results are taken for different scenarios depending on

number of capacitors and DGs and their sizes on 12 bus, 41 bus and 141 bus distribution systems while in the presence of different types of load.

Network reconfiguration and DG siting in 33 and 69 distribution system is carried out through Adaptive-Shuffled-Frogs-Leaping algorithm by considering seven scenarios while reducing power losses and improving voltage stability as a combine function. Maximum power loss is achieved at best suitable scenario are 75.57 and 84.90 percent in 33 and 69 bus system respectively while voltage stability is improved 35.45 and 40.82 percent in 33 and 69 bus system respectively as compare to previous algorithms and methods [10].

Suitable size of DGs are essential for economic benefit therefore in addition of real and reactive loss minimization and enhancement in voltage stability, cost of DG is also involved in combine objective function by siting and sizing of DGs using Cuckoo-search algorithm. Four types of DGs are considering i.e. supplying active power at unity pf, supplying reactive power only at null pf, supplying active power and absorbing of reactive power at pf between [0,1] and supplying active and reactive power at pf between [0,1]. The method is implemented on IEEE 33 bus system in the presence five different models of loads and compared results with PSO and GA [11].

[12] Whole system reactive losses are reduced by siting and sizing of DGs and capacitors using dragonfly algorithm. Different cases are considered depending on number and size of DGs and capacitors placement in the distribution IEE 33 bus system. The results are compared with PSO and others algorithms in previous methods.

2.1. RESEARCH GAP

As discussed the literature survey, following points are observed.

- Every author in the literature studied the placement of DG and its size on the basis of static load using some algorithms and techniques.
- Some considers probabilistic generation of PV and wind for obtaining net powers at buses to calculate DG size and position in the presence of uncertain load and generation.

- Few of them examined the DG sizes for day time and some of them for whole day on the basis of PV and wind DG while calculating DG size and position at average load.
- Some of them consider different types of load models for DG siting and sizing but all of them considers static load of that type.
- Only single author uses CIGRE bench mark model as test system while considering the load without variation.
- Some of researchers studied scenarios in which they were considering the number of DGs and capacitors for allocating in the system.
- No one of them implemented through BRO and APSO algorithm.
- Many of the above authors studies multi-objective-functions on single point while some of them considers also average of multi-objective-functions.
- Almost above all considers static generation from renewable DGs while lacking of consideration of variations in generation for choosing optimum size DG.
- None of the above uses concept relevant to regret criteria for DG planning,

2.2. MAIN CONTRIBUTIONS

In current thesis, following unique work is doing.

- Minimization of active power losses, reactive power losses and improvement of bus voltage profiles are achieved in current study.
- Variation in loads are considered at each time instant of day.
- Variation in generation of power from wind and solar DG is studied which is depending on wind speed and solar irradiance at different time of day respectively.
- Considering each variation of generation and load and studies system behavior for each change at different time of day.
- There are 24 scenarios which are considered in which every scenario has different load and generation value.
- For each scenario DG position and size is obtained through BRO and APSO on the basis of minimum multi-objective-function.

- On the basis of results obtained in each scenario, single optimum size and position of DG is obtained through regret criteria.
- Line losses of each branch for each instant of day, power losses for each time of day and bus voltage profiles for each scenario are studied.
- The method is implemented on CIGRE Bench mark model and compare the results taken with BRO, GA and APSO algorithm.

Chapter 3

Related topics and Proposed Algorithm

CHAPTER 3. RELATED TOPICS AND PROPOSED ALGORITHM

3.1. Robust Solution

Robust solution is the solution which is well or some time not very bad along all scenarios and minimize among all scenarios [13]. The solution is better than worst solution at each scenario.

3.2. Min-max Regret

Min–max regret criteria give the robust solution which is best among worst situation [13] and can be applicable for decision when there is input data variation. According to this concept, robust minimum solution can be obtained by selecting minimum fitness value throughout all scenarios while fitness value of each scenario can be obtained by subtracting best solution among candidate solutions of a scenario from best optimal solution of that scenario [14].

3.3. Load Flow Analysis

Load Flow analysis (LFA) is the organise way for calculating bus voltage profiles and their angles, net powers at different buses, power flow across generators ,loads and branches under static condition of the system [1] which helps in calculating system losses and performance. By system behaviour, it can be useful for DG planning. As the size of power systems are increasing day by day, therefore calculations are solving manually is assumed to be impossible for which Fast-decoupled, Gauss-Seidel, Newton-Raphson and many other methods are developed for iterative solving of load flow calculations. Newton-Raphson-load-flow (NRLF) method converges fast as quadratic convergence. The load flow analysis and Newton-Raphson are discussed from [15].The voltage across w bus of any system can be calculated using (1) [16].

$$\underline{V_w} = \frac{1}{\underline{Y_{ww}}}\left[\frac{(P_w - jQ_w)}{\underline{V_w^*}} - \sum_{\substack{w=1 \\ w\neq 1}}^{Num} \underline{Y_{wi}}\,\underline{V_i}\right] \quad (1)$$

Phasor voltages of buses are denoted by $\underline{V}$ while $\underline{V}^*$ and V are the phasor conjugate and magnitude of the bus respectively. The magnitudes of active and reactive power of bus w are represented by P_w and Q_w respectively. $\underline{Y_{ww}}$ and $\underline{Y_{wi}}$ are representing Y bus phasor matrix and Y bus phasor matrix between w and i bus respectively while Y_{ww} and Y_{wi} are their magnitudes. Num Shows the total buses in the system.

$$P_w = \sum_{i=1}^{Num} Y_{wi}\, V_i V_w \cos(\theta_{wi} + \delta_i - \delta_w) \quad (2)$$

$$Q_w = -\sum_{i=1}^{Num} Y_{wi}\, V_i V_w \,\text{sine}(\theta_{wi} + \delta_i - \delta_w) \quad (3)$$

Active and reactive power across each bus can be calculate using (2) and (3) respectively while P_w and Q_w are active and reactive power at bus w. θ and δ refers the angle of Y-bus and voltages at relevant b buses. The voltages calculated at each bus helps in calculation of line currents of different branches using following equation.

$$\underline{I_{wi}} = \frac{\underline{V_w} - \underline{V_i}}{\underline{Z_{wi}}} \quad (4)$$

The current and impedance related to relevant branches are denoted I and Z respectively while S is the apparent power. The apparent powers at each bus can be calculated using following equations.

$$\underline{S_w} = \underline{V_w}\underline{I_{wi}^*} \quad (5)$$

$$S_w = P_w - jQ_w \quad (6)$$

$$\underline{S_i} = \underline{V_i}\underline{I_{wi}^*} \quad (7)$$

$$S_i = P_i - jQ_i \quad (8)$$

Line losses between two buses can be calculated by taking difference of powers between those two buses.

$$P_{loss\,wi} = P_w - P_i \tag{9}$$

3.4. Accelerated-Particle-Swarm-Optimization (APSO) algorithm

The APSO is the updated and simpler version of PSO which is best suitable for converging faster which is discussed in details [17, 18] with addition of pseudo code. In APSO only global best position is used. The velocity V_j of particle P_j is updated using following equation;

$$V_j^{Time+1} = V_j^{Time} + \alpha\varepsilon + \beta(P_{global} - X_j^{Time}) \tag{10}$$

For increasing convergence, location of particle is just written using following equation instead of using velocity equation while ε is the vector containing random values between 0 and 1.

$$X_j^{Time+1} = (1-\beta)X_j^{Time} + \beta P_{global} + \alpha\varepsilon \tag{11}$$

The variable $\alpha = 0.1Le{\sim}o.5Le$ while Le is the scaling factor of each variable while β value in between 0.1 and 0.7 .In APSO randomness is reduced while moving towards updated iterations though inserting of α parameter as decreasing function.

$$\alpha = \alpha_0\gamma^{Time} \quad (0 < \gamma < 1) \tag{12}$$

The value $\alpha_0 = 0.5{\sim}1$ is initial random value while γ is control variable.

The flow diagram of APSO algorithm is shown Figure 1: APSO Flow Diagram from [19].

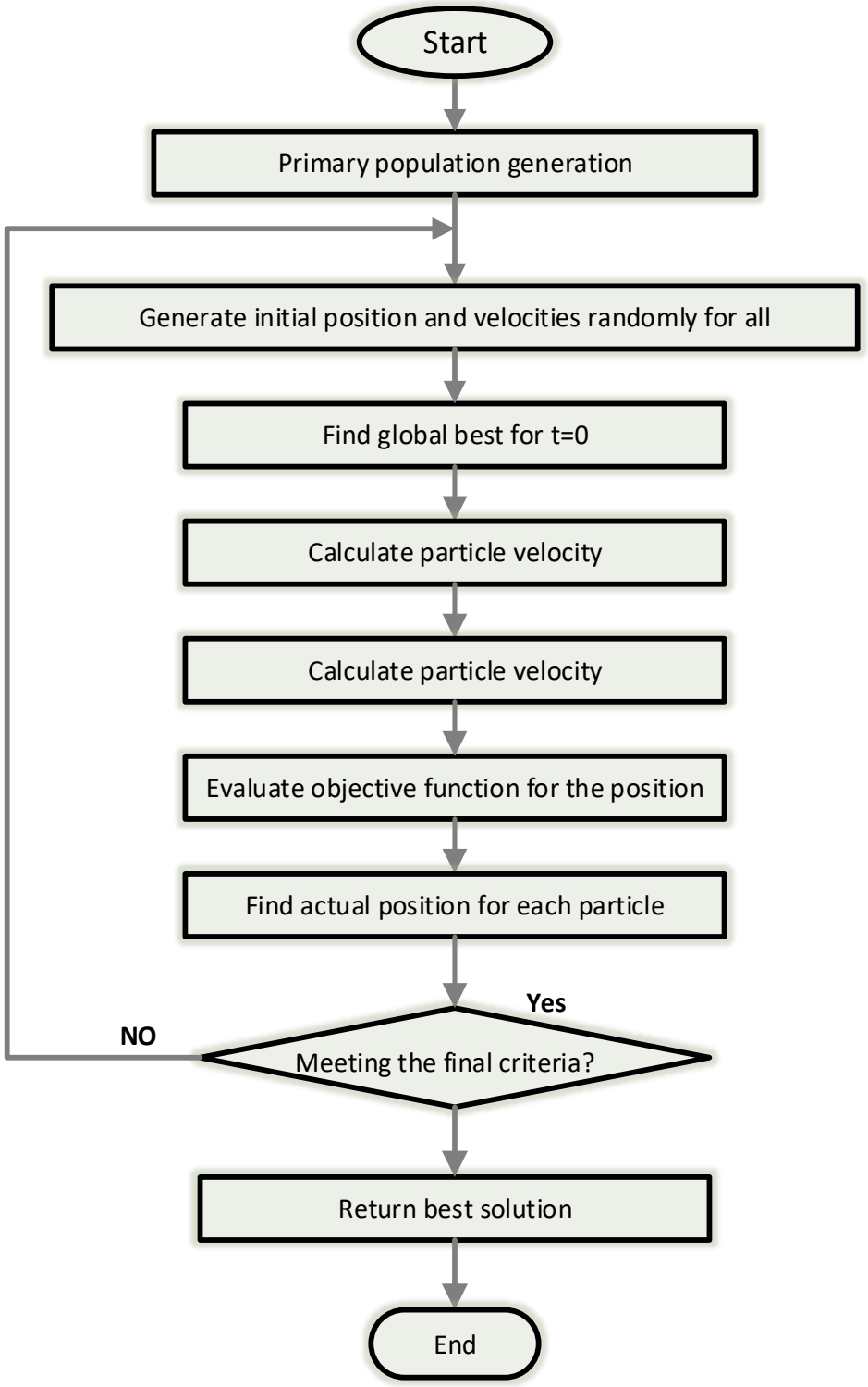

Figure 1: APSO Flow Diagram

3.5. Genetic Algorithm

[20] GA is basically inspired from natural selection mechanism, whereas each population is consider as chromosome. The functions used in GA are individual selection, crossover and mutation and at last fitness function on which optimal solution will be selected. [21]The algorithm is used for obtaining better offspring to get optimum solution relevant to type of problem. In start, the randomly generation of population is used as number of chromosomes. For each offspring, two chromosomes are selected on the basis of fitness value and single point crossover is applied to get new offspring. The mutation operator is then used on offspring with certain probability and then placed in the new population. The process selection-crossover-mutation is applied on each population and repeated until all new population is generated to obtain optimal solution. The details about GA is discussed in [20] while its Flow diagram is shown in Figure 2 whereas pseudo code steps are describes below in Algorithm 1.

Algorithm 1 The pseudocode of a GA

1: Set initial parameters

2: Choose encode method

3: Generate the initial random populations

4: ***while*** *i < Max-iteration and Bestfitness < Max-fitness* ***do***

5: Fitness calculation

6: Selection

7: Crossover

8: Mutation

9: ***end while***

10: Decode the individual with maximum fitness

11: return the best solution

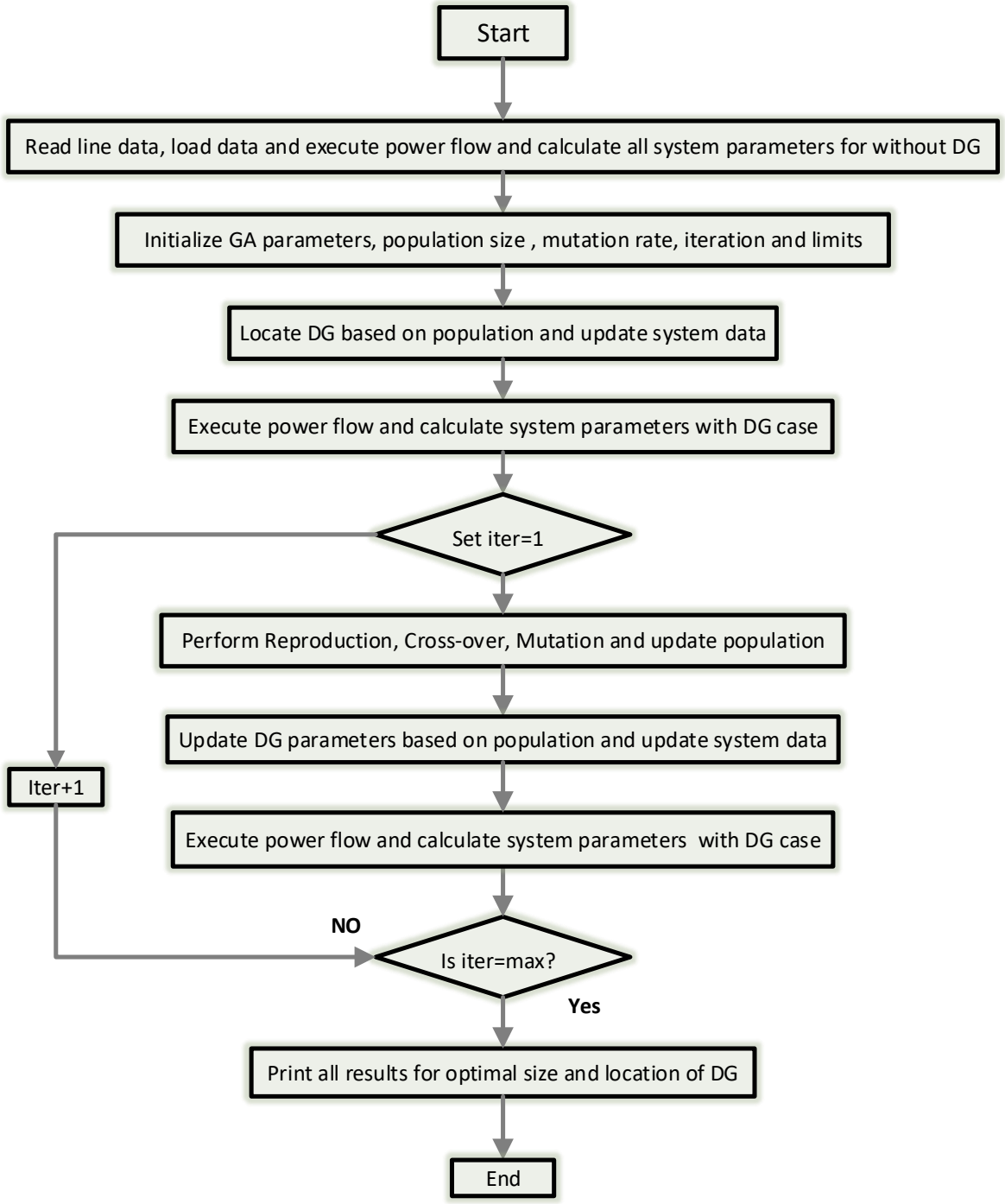

Figure 2: Genetic Algorithm Flow Diagram

3.6. Battle Royal Optimization (BRO Algorithm)

BRO is metaheuristic algorithm [21], basically inspired from idea of battle royal games like PUBG and Call of Duty. In these type of games, each player is randomly placed within game space and having same amount of resources and similar strength. Each player has not only compete with other players only, but with game also, as region of playing game is continuously decreases throughout the game. The player caught outside the game area/game region either increase in damage level or even elimination from the game. The player tries to move safe region and kill the opponent player while the player killed or hurt by any opponent player can get increase in damage level or reoccurrence in the game. The player wins one having maximum number of kills. BRO algorithm search process is presented as follows:

Step 1: In 1st step the algorithm parameters which includes no of population, iterations and maximum fault level are initialized

Step 2: Random population is generated within problem space.

Step 3: Each individual try to hurt nearest soldier.

Step 3: The soldier hurt by opponent soldier can cause one point increase in damage level.

Step 4: The player experiences damage tries to change position between previous and $x_{B,dim}$ best position within dimension dim by following equation.

$$x_{D,dim} = x_{D,dim} + r(x_{B,dim} - x_{D,dim}) \quad (13)$$

Where r is random number between 0 and 1.

Step 5: If damage level of soldier reaches up to predefine threshold the soldier dies and reallocate with in feasible region while damage level reset to zero.

$$x_{D,dim} = r(ub_{dim} - lb_{dim}) + lb_{dim} \quad (14)$$

While ub_{dim} and lb_{dim} are the upper and lower bounds.

Step 6: After each iteration the search space shrinks to move towards best solution.

$$lb_{dim} = x_{B,dim} - SD(\overline{x_d}) \quad (15)$$

$$ub_{dim} = x_{D,dim} + SD(\overline{x_d}) \quad (16)$$

$SD(\overline{x_d})$ is the standard deviation of all population.

Step 7: After each iteration the best solution is kept saved.

The flow diagram and pseudo-code of BRO are showed in Figure 3: Battle Royale Optimisation Algorithm Flow Diagramand Algorithm 2 respectively.

Algorithm 2 The pseudocode of a BRO

Begin
Randomly initialize a population ($\vec{x}$)
Initialize all parameters;
$shrink$= ceil ($\log_{10}(MaxXcicle)$)
Δ= round ($MaxXicle$/Shrink)
$Iter = 0$;
while termination criterion is not met **do**
$iter = iter + 1$
for i=1:population_size
//compare i^{th} soldier with nearest one (j^{th})
$dam = j$
$vic = i$
If $f(x_i) < f(x_j)$
$dam = j$
$vic = i$
end if
if $x_{dam}.damage < threshold$
for $d = 1: Dimension$
change the position of damaged soldier based on:
$x_{dam}.d = r(\max(x_{dam,d}, x_{best,d}) - \min(x_{dam,d}, x_{best,d}) + \max(x_{dam,d}, x_{best,d}))$
end for ***d***
$x_{dam}.damage = x_i.damage + 1$
$x_{vic}.damage = 0$
else
for $d = 1: Dimension$
$x_{dam}.d = r(ub_d - lb_d) + lb_d$
end for ***d***
update $f(x_{dam})$
$x_{dam}.damage = 0$
end for ***i***
if $iter >= \Delta$
update $(ub_d - lb_d)$ based on equation 15 and 16
Δ= Δ + round(Δ/2);
end if
if the lb_d or ub_d exceeds the original lower/upper bound then it set to the original lb_d or ub_d
end while
Select the best soldier as the solution.

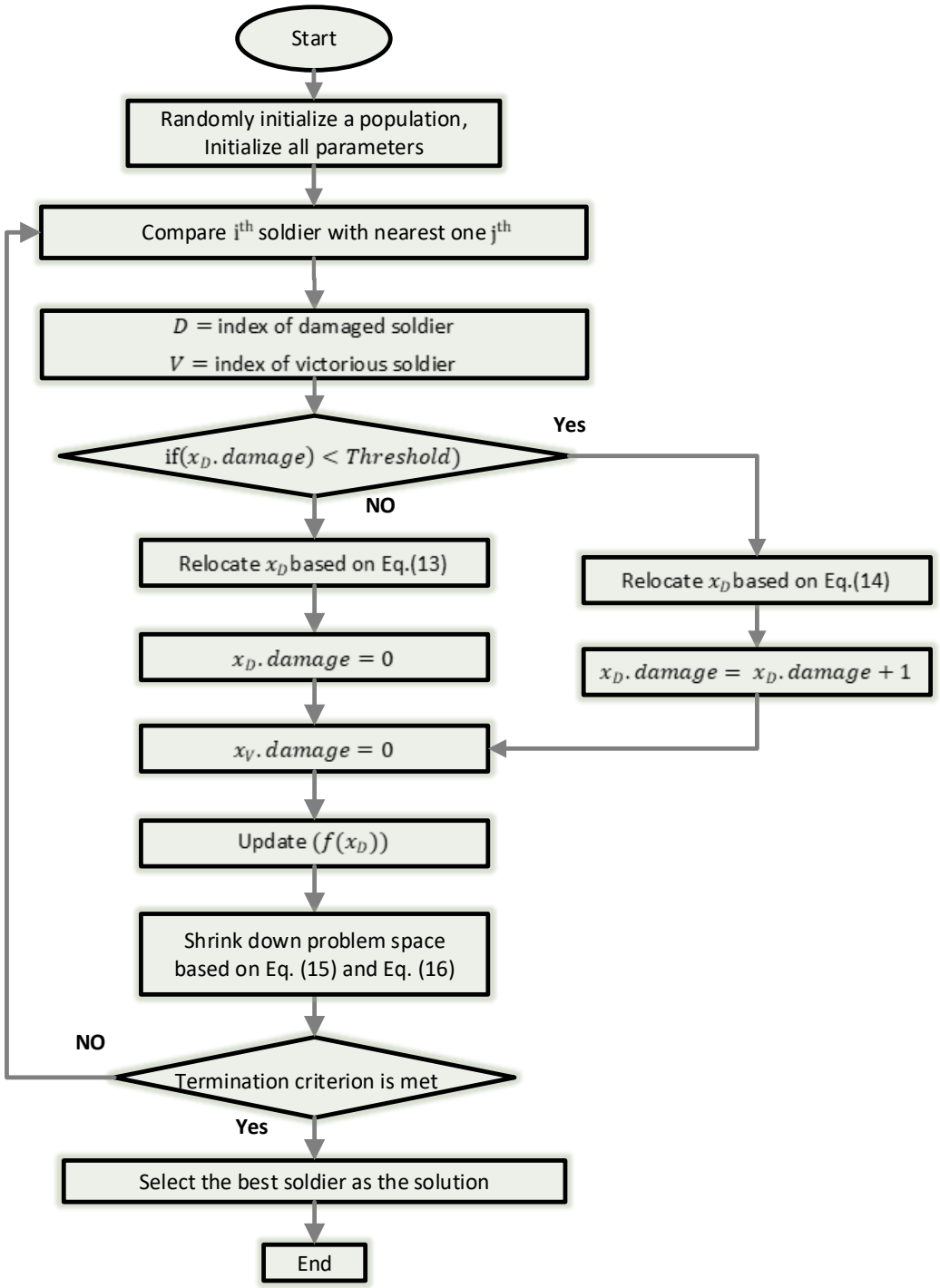

Figure 3: Battle Royale Optimisation Algorithm Flow Diagram

Chapter 4

Methodology

CHAPTER 4. METHODOLOGY

The objective functions with its' constrains and steps involving in achievement of objectives are discussed in details.

4.1. Scenarios

As we have to find robust solution for different time of day. In every hour of the day load have certain changes due to demand. In current problem, the robust solution is obtained using min-max regret concept with using different scenarios. In present situation, each hour is assumed as a separate scenario while there are 24 hours in a day so there are 24 scenarios, for each scenario load values and output power of solar and wind generator fluctuates. The solar power values at each scenario illustrated in **Table 3** are from Figure 5 while wind power values are also illustrated in same table are from Figure 7. The active and reactive load during each scenario are from **Table 5** and **Table 6** respectively.

4.2. Ideal Values

While considering min max regret concept, the optimum value during each scenario is considered as ideal value in current thesis. The ideal value is basically consider as maximum minimized value at that time step. While in current method, the ideal solution at each scenario/ time step is the MO value taken at 2000 iterations with 100 population size in each algorithm shown in **Table 1**.

4.3. Objectives to be minimized

4.3.1. Active Power Loss (APL)

APL is the first objective to minimize in current problem which can be calculated using net real losses across each line.

$$Line\ (L)_{A\ loss} = P_W - P_P \quad (17)$$

$$Total\ Active\ Power\ losses = \sum_{l=1}^{nl} Line(l)_{Aloss} \quad (18)$$

P_w And P_p are active powers across bus w and p respectively while $Line(l)_{Aloss}$ is the active loss at line l whereas nl tell the total number of lines in the system.

4.3.2. Reactive Power Loss (RPL)

RPL is the second objective to minimize in current problem which can be calculated using net relative losses across each line.

$$Line\ (L)_{Rloss} = R_w - R_p \quad (19)$$

$$Total\ Reactive\ Power\ losses = \sum_{l=1}^{nl} Line(l)_{Rloss} \quad (20)$$

R_w And R_p are reactive powers across bus w and p respectively while $Line(l)_{Rloss}$ is the reactive loss at line l whereas nl tells the total number of lines in the system.

4.3.3. Voltage Drop

Voltage drop is the third objective that is maximize across each bus for considering bus in safe limits

4.4. Constraints

The objectives used should have some constraints must to achieve are following.

4.4.1. Limitations of DGs' Capacity

The active and reactive power supplied by each DG have some upper and lower bound given in the below equation.

$$0 < P_{DG}, Q_{DG} \leq Limit \quad (21)$$

P_{DG} and Q_{DG} are active and reactive powers delivered by each DG while measuring in kW and KVAR.

4.4.2. Power Balance

The powers supplied by each DG and Grid must be equal to load and losses.

$$\sum P_{DG} + P_{Grid} = \sum P_{load} + P_{loss} \quad (22)$$

$$\sum Q_{DG} + Q_{Grid} = \sum Q_{load} + Q_{loss} \quad (23)$$

4.5. Multi-Objective-Index (MO)

[3]Multi-objective-index (MO) is the combination of active-power-loss-index (API), reactive-power-loss-index (RPI) and voltage-deviation-index (VD) to minimize our objectives. MO is objective value in current thesis which means optimal DG size and location can be achieved at minimize MO value that is basically ultimate goal to minimize total active and reactive power losses and improvement in bus voltages. The weight factors to each index used in current problem is from [3] shown in below,

$$MO = w1 * APL + w2 * RPL + w3 * VD \quad (24)$$

Each index carrying normalized value within [0, 1] and discussed in below topic.

4.5.1. APL

The APL is active power loss index which is expressed as ratio of AP_{LDG} and AP_L

$$APL = [AP_{LDG}/AP_L] \quad (25)$$

While AP_{LDG} and AP_L are active power losses with and without DG respectively.

Table 1: Ideal Values

Scenarios	*BRO*	*GA*	*APSO*
1	0.5027	0.5143	0.5027
2	0.5643	0.5643	0.5642
3	0.6560	0.5580	0.5580
4	0.5642	0.5642	0.5642
5	0.4984	0.4869	0.7834
6	0.2326	0.2326	0.2537
7	0.1118	0.1118	0.1083
8	0.0893	0.0924	0.0924
9	0.1015	0.0922	0.0954
10	0.0822	0.0822	0.1991
11	0.1207	0.1170	0.1170
12	0.0920	0.0834	0.0920
13	0.0973	0.1006	0.1070
14	0.1207	0.1245	0.1207
15	0.1433	0.1474	0.1567
16	0.1683	0.1682	0.6334
17	0.1416	0.1332	0.1292
18	0.0934	0.0933	0.1027
19	0.0734	0.0734	0.0762
20	0.0953	0.0953	0.1048
21	0.1457	0.1414	0.1456
22	0.2060	0.2116	0.2116
23	0.3659	0.3570	0.3570
24	0.5788	0.5318	0.5318

4.5.2. RPL

The RPL is reactive power loss index which is expressed as ratio of RP_{LDG} and RP_L

$$RPL = [RP_{LDG}/RP_L] \quad (26)$$

While RP_{LDG} and RP_L are reactive power losses with and without DG respectively.

4.5.3. VD

The placement of optimal DG size in a system results in improvement voltage profile. Voltage deviation index VD must be small, as higher the value shows larger deviation will be from initial value.

$$VD = max_{b=1}^{n}\left(\frac{|V_{ini}| - |V_b|}{|V_{ini}|}\right) \quad (27)$$

The total number of busses are n and V_b is the bus voltage after placement of DG in the system and V_{ini} is basically the initial voltage and consider as 1.03.

Table 2: Weight Factors

Indices	*W*
APL	0.5
RPL	0.25
VD	0.25

4.6. Computational Procedure

In current thesis, the basic objective is to stabilize the distribution system by minimization of system losses and improvement in bus voltage profiles at the time of varying load and renewable resources as the fluctuations in renewable resources causes variations in output powers. The methodology involves the concept of min-max regret concept to obtain robust solution by making different scenarios. As the load and renewable power is changed at each hour therefore different scenarios are formed while each scenario or hour is having distinct load and renewable power. As the current study involves 24 hours so 24 scenarios are formed having unique load and renewable generation. First of all, Newton-Raphson load flow analysis is carried out at each scenario and obtain optimum size DGs using different algorithms on the basis of minimum values of MO. These obtained DGs are placed in the test system one by one to obtained MO at each scenario. The fitness value is obtained by subtracting ideal value (minimum optimum MO value) at each scenario from MO value calculated at that specific scenario. Total fitness value of each DG is obtained by summation of all fitness values of specific DG of each scenario. The DG having least total fitness value is considered as desire solution for 24 hours. The present work is different among all previous work, as current study involves the loss minimization and enhancement in bus voltage profiles for the period of 24 hours with time step of one hour. Details of min-max regret, scenarios, ideal values and MO are discussed in previous section. The flow chart of methodology is shown in Figure 4: Flow chart Methodology while steps involving to achieve objective are following:

St. 1: Initializing basic parameters of BRO, GA and APSO algorithms and set the population size and number of iterations.

St. 2: Perform NRLF without integrating DG in the system and calculate AP_L and RP_L for each scenario / hour. As at each hour, renewable DGs used in the system have variations in output power because of fluctuating nature of wind and solar while load is also changing at each time step with people demand.

St. 3: At each scenario, find optimum DG sizes and locations on the basis of minimum MO values through BRO, GA and APSO algorithms.

$$DGs_{Sc=1,2,3,\ldots..,24} = [dgs1\ \ dgs2\ \ dgs3\ \ dgl1\ \ dgl2\ \ dgl3] \quad (28)$$

$MO_{Sc=1,2,3,\ldots..,24}$

DGs Show combination of DGs placed in the test system at scenario Sc while dgs and dgl tells size and location of DGs at that scenario respectively while coefficient shows the number of DGs placed at each scenario. As in current problem, there are 24 hours and each hour is consider as one scenario therefore Sc reaches up to 24.

St. 4: Sort MO values in ascending order and select ten best DG locations and sizes at ten best MO values at each scenario.

$$MO_{Sc=1,2,3,\ldots..,24} = [MO1\ MO2\ MO3\ MO4\ MO5\ MO6\ MO7\ MO8\ MO9\ MO10] \quad (29)$$

$$DGs_{Sc=1,2,..24} = [DGs1\ DGs2\ DGs3\ DGs4\ DGs5\ DGs6\ DGs7\ DGs8\ DGs9\ DGs10] \quad (30)$$

While

$$DGs1_{Sc} = [dgs1\ \ dgs2\ \ dgs3\ \ dgl1\ \ dgl2\ \ dgl3] \quad (31)$$

$$DGs2_{Sc} = [dgs1\ \ dgs2\ \ dgs3\ \ dgl1\ \ dgl2\ \ dgl3]$$

$$DGs3_{Sc} = [dgs1\ \ dgs2\ \ dgs3\ \ dgl1\ \ dgl2\ \ dgl3]$$

…

…

…

$$DGs10_{Sc} = [dgs1\ \ dgs2\ \ dgs3\ \ dgl1\ \ dgl2\ \ dgl3]$$

So at each scenario, ten DGs are selected so total 240 DGs are chosen.

St. 5: Place each DG in the system one by one and calculate,AP_{LDG}, $RP_{LDG}$and V_b at each scenario.

St. 6: Calculate MO for each DG at each scenario on the behalf of AP_L ,RP_L , AP_{LDG}, RP_{LDG} and V_b calculated at St. 2 and St. 5 while MO_{DGs1} is the MO values calculated by DGs 1 at all scenarios and MO_{s1} is the MO value calculated by specific DG at $s1$ i.e. scenario 1.

$$MO_{DGs1} = [MO_{DGs=1,s=1}, MO_{DGs=1,s=2}, MO_{DGs=1,s=3}, , \dots\dots\dots\dots\dots\dots\dots, MO_{DGs=1,s=24}] \quad (32)$$

$$MO_{DGs2} = [MO_{DGs=2,s=1}, MO_{DGs=2,s=2}, MO_{DGs=2,s=3}, , \dots\dots\dots\dots\dots\dots\dots, MO_{DGs=2,s=24}]$$

$$MO_{DGs3} = [MO_{DGs=3,s=1}, MO_{DGs=3,s=2}, MO_{DGs=3,s=3}, , \dots\dots\dots\dots\dots\dots\dots, MO_{DGs=3,s=24}]$$

… …..

… …..

$$MO_{DGs240} = [MO_{DGs=240,s=1}, MO_{DGs=240,s=2}, MO_{DGs=240,s=3}, , \dots\dots\dots\dots\dots\dots\dots, MO_{DGs=240,s=24}]$$

As at each scenario ten best DGs are chosen, so overall DGs become therefore DGs=240.

St 7: Find fitness value for each scenario by subtracting ideal IMO value of that scenario from MO value obtained by each DG for that specific video.

$$MO_{DGs1} = [MO_{DGs=1,s=1}, MO_{DGs=1,s=2}, MO_{DGs=1,s=3}, , \dots\dots\dots\dots\dots\dots\dots, MO_{DGs=1,s=24}] \quad (33)$$

$$IMO = [IMO_{s1}, IMO_{s2}, IMO_{s3}, \dots\dots\dots\dots\dots\dots, IMO24] \quad (34)$$

$$Fit_{DGs1,sc=1} = [MO_{DGs=1,s=1} - IMO_{s1}] \quad (35)$$

$$Fit_{DGs1,sc=2} = [MO_{DGs=1,s=2} - IMO_{s2}]$$

$$Fit_{DGs1,sc=3} = [MO_{DGs=1,s=3} - IMO_{s3}]$$

$$Fit_{DGs1,sc=4} = [MO_{DGs=1,s=4} - IMO_{s4}]$$

….

….

$$Fit_{DGs1,sc=24} = [MO_{DGs=1,s=24} - IMO_{s24}]$$

St 8: Add up each fitness value of all scenarios for each DG and consider as total fitness value at specific DG.

$$TFit_{DGs1} = \sum_{sc=1}^{sc=24} (Fit_{DGs1,sc=1,} Fit_{DGs1,sc=2,}, Fit_{DGs1,sc=3,}, \dots\dots\dots, Fit_{DGs1,sc=24}) \quad (36)$$

$$TFit_{DGs2} = \sum_{sc=1}^{sc=24} \left(Fit_{DGs1,sc=1,} Fit_{DGs1,sc=2,}, Fit_{DGs1,sc=3,}, \dots\dots\dots, Fit_{DGs1,sc=24}\right)$$

$$TFit_{DGs3} = \sum_{sc=1}^{sc=24} (Fit_{DGs1,sc=1,} Fit_{DGs1,sc=2,}, Fit_{DGs1,sc=3,}, \dots\dots\dots, Fit_{DGs1,sc=24})$$

….

….

….

$$TFit_{DGs240} = \sum_{sc=1}^{sc=24} (Fit_{DGs1,sc=1,} Fit_{DGs1,sc=2,}, Fit_{DGs1,sc=3,}, \dots\dots\dots, Fit_{DGs1,sc=24})$$

St 9: Sort total fitness values $TFit$ of each DG in ascending order and check minimum value within total fitness value of each DG.

$$RS\ index = min[TFit_{DGs1}, TFit_{DGs2}, TFit_{DGs3}, \dots\dots\dots\dots\dots, TFit_{DGs240}] \quad (37)$$

St 10: DGs combination having least value of $TFit$ having $RS\ index$ consider as desire solution which will be robust solution for all scenarios.

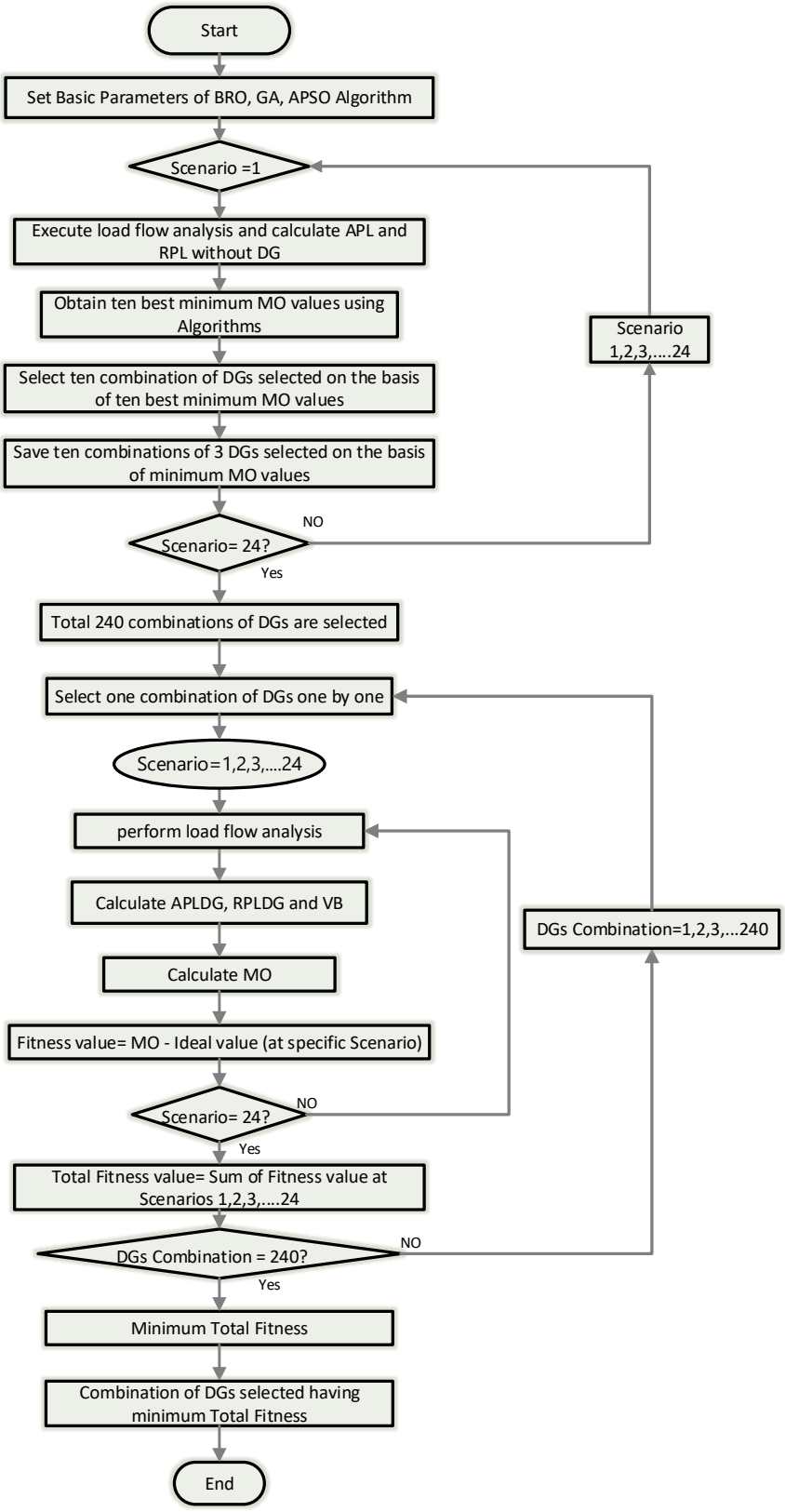

Figure 4: Flow chart Methodology

Table 3: Scenarios

Scenarios	*Solar Power*	*Wind Power*	*Active Load*	*Reactive Load*
1	At point 1	At point 1	At Time 1 Column 'Bus 1'to 'Bus 14'	At Time 1 Column 'Bus 1'to 'Bus 14'
2	At point 2	At point 2	At Time 2 Column 'Bus 1'to 'Bus 14'	At Time 2 Column 'Bus 1'to 'Bus 14'
3	At point 3	At point 3	At Time 3 Column 'Bus 1'to 'Bus 14'	At Time 3 Column 'Bus 1'to 'Bus 14'
4	At point 4	At point 4	At Time 4 Column 'Bus 1'to 'Bus 14'	At Time 4 Column 'Bus 1'to 'Bus 14'
5	At point 5	At point 5	At Time 5 Column 'Bus 1'to 'Bus 14'	At Time 5 Column 'Bus 1'to 'Bus 14'
6	At point 6	At point 6	At Time 6 Column 'Bus 1'to 'Bus 14'	At Time 6 Column 'Bus 1'to 'Bus 14'
7	At point 7	At point 7	At Time 7 Column 'Bus 1'to 'Bus 14'	At Time 7 Column 'Bus 1'to 'Bus 14'
8	At point 8	At point 8	At Time 8 Column 'Bus 1'to 'Bus 14'	At Time 8 Column 'Bus 1'to 'Bus 14'
9	At point 9	At point 9	At Time 9 Column 'Bus 1'to 'Bus 14'	At Time 9 Column 'Bus 1'to 'Bus 14'
10	At point 10	At point 10	At Time 10 Column 'Bus 1'to 'Bus 14'	At Time 10 Column 'Bus 1'to 'Bus 14'
11	At point 11	At point 11	At Time 11 Column 'Bus 1'to 'Bus 14'	At Time 11 Column 'Bus 1'to 'Bus 14'
12	At point 12	At point 12	At Time 12 Column 'Bus 1'to 'Bus 14'	At Time 12 Column 'Bus 1'to 'Bus 14'
13	At point 13	At point 13	At Time 13 Column 'Bus 1'to 'Bus 14'	At Time 13 Column 'Bus 1'to 'Bus 14'
14	At point 14	At point 14	At Time 14 Column 'Bus 1'to 'Bus 14'	At Time 14 Column 'Bus 1'to 'Bus 14'
15	At point 15	At point 15	At Time 15 Column 'Bus 1'to 'Bus 14'	At Time 15 Column 'Bus 1'to 'Bus 14'
16	At point 16	At point 16	At Time 16 Column 'Bus 1'to 'Bus 14'	At Time 16 Column 'Bus 1'to 'Bus 14'
17	At point 17	At point 17	At Time 17 Column 'Bus 1'to 'Bus 14'	At Time 17 Column 'Bus 1'to 'Bus 14'
18	At point 18	At point 18	At Time 18 Column 'Bus 1'to 'Bus 14'	At Time 18 Column 'Bus 1'to 'Bus 14'

19	At point 19	At point 19	At Time 19 Column 'Bus 1'to 'Bus 14'	At Time 19 Column 'Bus 1'to 'Bus 14'
20	At point 20	At point 20	At Time 20 Column 'Bus 1'to 'Bus 14'	At Time 20 Column 'Bus 1'to 'Bus 14'
21	At point 21	At point 21	At Time 21 Column 'Bus 1'to 'Bus 14'	At Time 21 Column 'Bus 1'to 'Bus 14'
22	At point 22	At point 22	At Time 22 Column 'Bus 1'to 'Bus 14'	At Time 22 Column 'Bus 1'to 'Bus 14'
23	At point 23	At point 23	At Time 23 Column 'Bus 1'to 'Bus 14'	At Time 23 Column 'Bus 1'to 'Bus 14'
24	At point 24	At point 24	At Time 24 Column 'Bus 1'to 'Bus 14'	At Time 24 Column 'Bus 1'to 'Bus 14'

CHAPTER 5

RESULTS

CHAPTER 5. EVALUATIONS AND RESULTS

First of all, load flow analysis is carried out on test system "CIGRE MV/LV Benchmark model" to find active and reactive power, voltage at each bus and system losses and line losses in each line. As the whole method of loss minimization i.e. optimal DG location and sizing for system stability and reducing system losses is already described in previous chapter. The study involves placement of three DGs in the test system whereas considering 24 scenarios each one is representing single hour of the day having unique load and generation. The procedure is coded at mat lab 2018a software.

5.1. CIGRE MV/LV Benchmark model (Test System)

The model consists of 14 buses and 15 branches including DGs consisting of many renewable DGs and conventional DGs at different buses [23] shown in Figure 6 whereas the branches relevant to specific buses are described in **Table 4** .

5.1.1. Distributed Generators

Different types of DGs are connected at different buses of the test system which are from both categories that is conventional and non-conventional. Almost every DG has stable output power but two of them having variations in output power depending upon fluctuation in resources at different time of day that is solar and wind. The model also includes battery which is neglected in current problem because of charging and discharging behavior after specific period of time.

5.1.2. Solar power

As the solar irradiance fluctuates with strength of sun light at different time of day, so the output power from solar DG also varies. In CIGRE model, DGs having four different ratings i.e. 40kw, 30kw, 20kw and 10kw. The output power curve of each type of DG rating is shown in Figure 5 whereas curve is obtained by the product of PV per unit curve in [24] with size of PV DG. The curve shows that the output of each unit is maximum at noon as the strength of sun light is maximum at that time while the curve also shows that output of each unit does not reach to its

maximum rating due to material of PV unit and many other factors. The curve is at zero before 6 am and after 5 pm as the solar irradiance is absent or below threshold at that time of the day.

5.1.3. Wind Power

The power from wind DG also varies with speed of air. The wind DG used at CIGRE model having 1500 KW rating. The power extracted at each hour from the DG is shown in Figure 7 which is the product of wind DG size with per unit curve of wind DG in [24]. The highest power extracted from DG is at 12 mid night as the wind blows in high speed at nights while slow at day times.

5.1.4. Load

The load at each time instant of day varies with people demand. The residential and commercial loads are connected at different buses with different power factors are discussed in [25]. The active and reactive load connected at European version of CIGRE model are calculated at each hour of the day and shown in the **Table 5** and **Table 6** respectively.

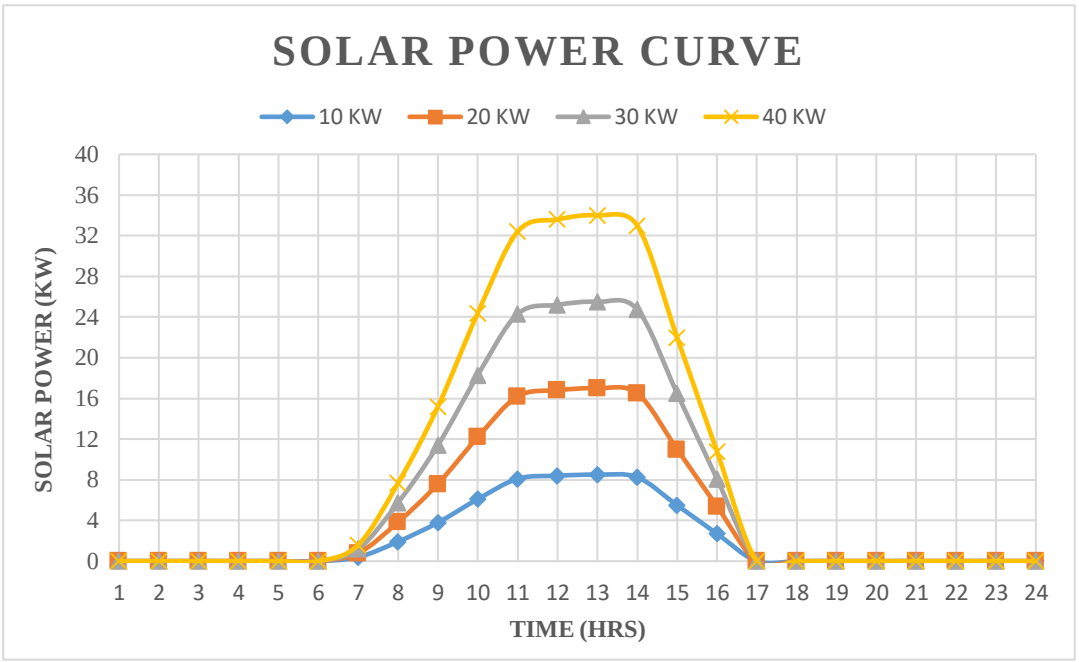

Figure 5: Solar Power Curve

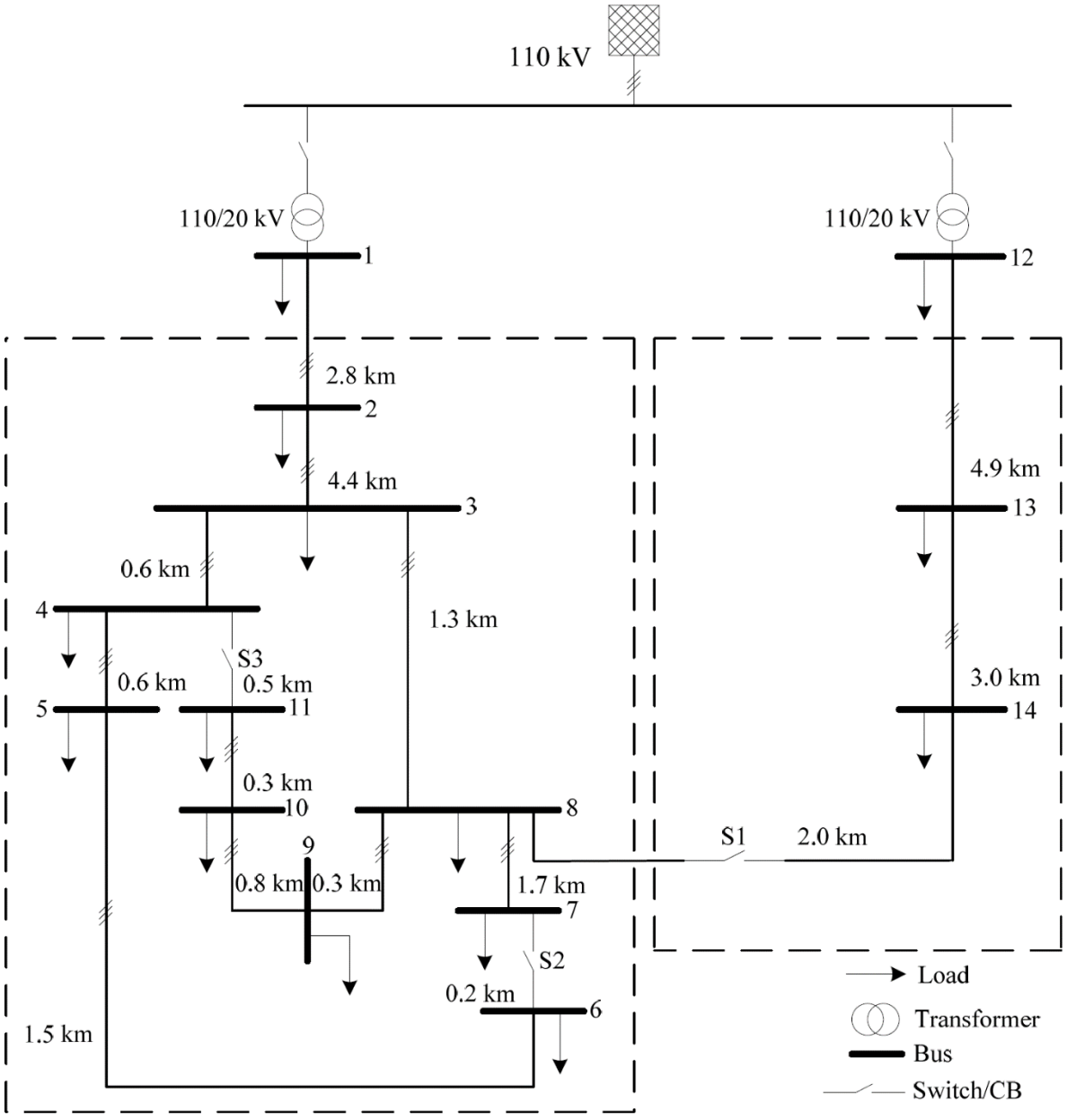

Figure 6: CIGRE Benchmark Model

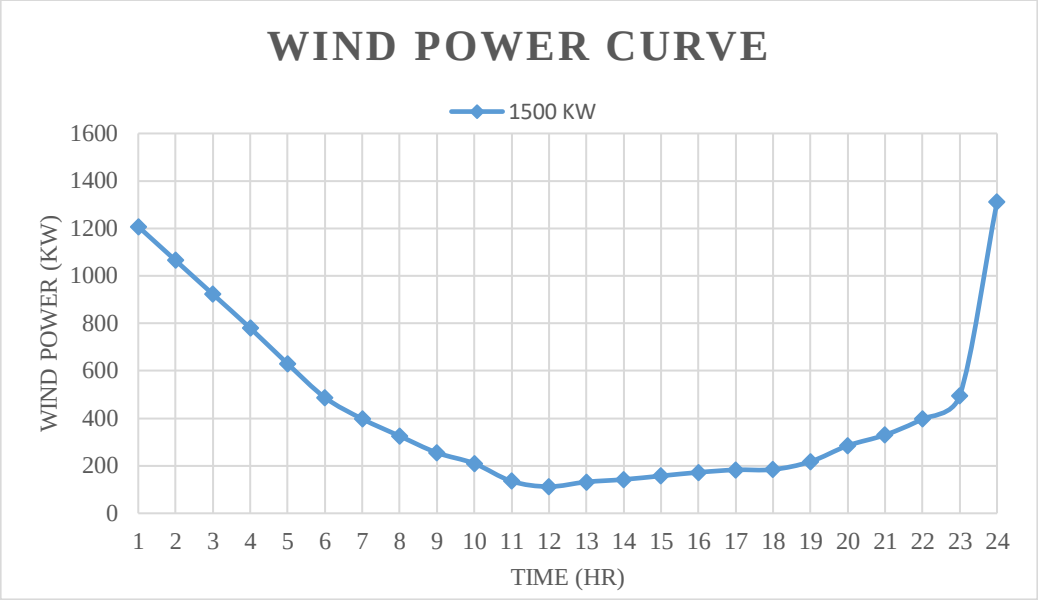

Figure 7: Wind Power Curve

Table 4: Branches

Branches	*From Bus*	*To Bus*
1	1	2
2	2	3
3	3	4
4	4	5
5	5	6
6	6	7
7	7	8
8	8	9
9	9	10
10	10	11
11	11	4
12	3	8
13	12	13
14	13	14
15	14	8

Table 5: Active Power Load

Active Power Load														
Time (Hrs)	*Bus1 (kw)*	*Bus2 (kw)*	*Bus3 (kw)*	*Bus4 (kw)*	*Bus5 (kw)*	*Bus6 (kw)*	*Bus7 (kw)*	*Bus8 (kw)*	*Bus9 (kw)*	*Bus10 (kw)*	*Bus11 (kw)*	*Bus12 (kw)*	*Bus13 (kw)*	*Bus14 (kw)*
1	5477.40	0.00	146.86	110.61	186.42	140.44	25.82	150.38	193.64	144.75	84.51	5535.11	11.48	165.32
2	5979.11	0.00	154.41	126.80	213.70	160.99	24.86	172.39	186.47	161.72	96.88	6034.69	11.05	169.00
3	4072.67	0.00	111.79	79.59	134.13	101.05	20.66	108.20	154.91	105.99	60.81	4118.84	9.18	127.96
4	3595.82	0.00	90.93	78.24	131.86	99.33	13.87	106.37	103.99	98.47	59.78	3626.81	6.16	97.88
5	4597.97	0.00	134.90	80.93	136.41	102.76	28.21	110.03	211.57	114.19	61.84	4661.03	12.54	161.34
6	5909.31	0.00	173.52	103.87	175.06	131.88	36.34	141.21	272.53	146.67	79.36	5990.53	16.15	207.65
7	9490.97	0.00	265.10	180.75	304.64	229.50	50.72	245.74	380.40	244.12	138.10	9604.35	22.54	307.12
8	13296.34	0.00	365.78	258.99	436.50	328.83	67.89	352.11	509.20	345.53	197.88	13448.10	30.18	419.34
9	14403.68	0.00	401.49	275.18	463.78	349.38	76.50	374.12	573.75	371.00	210.25	14574.68	34.00	464.45
10	14187.40	0.00	395.38	271.13	456.96	344.24	75.31	368.62	564.79	365.49	207.16	14355.73	33.47	457.32
11	14935.67	0.00	410.45	291.36	491.06	369.93	76.02	396.12	570.16	388.40	222.62	15105.60	33.79	470.20
12	12840.91	0.00	344.61	258.99	436.50	328.83	60.70	352.11	455.27	339.14	197.88	12976.60	26.98	388.18
13	14914.63	0.00	387.12	314.30	529.71	399.05	63.11	427.30	473.34	402.18	240.14	15055.71	28.05	425.34
14	13909.77	0.00	373.27	280.57	472.88	356.23	65.74	381.45	493.07	367.38	214.37	14056.73	29.22	420.44
15	12629.51	0.00	349.24	244.15	411.49	309.99	65.50	331.94	491.27	327.07	186.54	12775.93	29.11	401.81
16	11659.24	0.00	333.05	214.48	361.48	272.31	66.46	291.59	498.45	295.24	163.87	11807.79	29.54	391.61
17	10841.01	0.00	309.47	199.64	336.47	253.47	61.68	271.42	462.59	274.65	152.53	10978.88	27.41	363.73
18	12347.42	0.00	303.26	277.88	468.33	352.81	42.55	377.79	319.15	343.80	212.31	12442.54	18.91	318.65
19	14323.99	0.00	332.06	342.62	577.45	435.02	38.25	465.81	286.88	411.27	261.78	14409.49	17.00	331.29
20	16001.41	0.00	357.46	396.58	668.39	503.52	35.14	539.17	263.57	467.92	303.00	16079.96	15.62	343.89
21	14305.18	0.00	320.67	353.41	595.64	448.72	32.03	480.48	240.26	417.63	270.02	14376.79	14.24	309.57
22	12028.67	0.00	275.30	291.36	491.06	369.93	30.12	396.12	225.91	347.60	222.62	12096.00	13.39	271.30
23	10175.30	0.00	236.45	242.80	409.22	308.28	27.49	330.10	206.19	291.79	185.51	10236.75	12.22	236.44
24	7669.13	0.00	188.29	172.66	291.00	219.22	26.39	234.74	197.94	213.58	131.92	7728.12	11.73	197.79

Table 6: Reactive Power Load

Reactive Power Load														
Time (Hrs.)	*Bus1 (kvar)*	*Bus2 (kvar)*	*Bus3 (kvar)*	*Bus4 (kvar)*	*Bus5 (kvar)*	*Bus6 (kvar)*	*Bus7 (kvar)*	*Bus8 (kvar)*	*Bus9 (kvar)*	*Bus10 (kvar)*	*Bus11 (kvar)*	*Bus12 (kvar)*	*Bus13 (kvar)*	*Bus14 (kvar)*
1	5180.28	0.00	124.96	66.23	111.62	84.08	28.04	90.04	210.27	97.84	50.60	5233.01	12.46	153.49
2	5664.39	0.00	128.11	75.92	127.95	96.39	27.00	103.21	202.48	107.59	58.00	5715.17	12.00	153.67
3	3847.52	0.00	96.56	47.65	80.31	60.50	22.43	64.78	168.22	72.41	36.41	3889.71	9.97	120.21
4	3409.69	0.00	74.33	46.84	78.95	59.47	15.06	63.68	112.92	64.96	35.79	3438.01	6.69	87.88
5	4329.62	0.00	121.23	48.46	81.67	61.52	30.63	65.88	229.74	80.59	37.02	4387.24	13.61	156.15
6	6974.13	0.00	156.01	62.19	104.81	78.96	39.46	84.55	295.94	103.55	47.51	5638.40	17.54	201.03
7	8958.81	0.00	231.48	108.22	182.40	137.40	55.08	147.13	413.07	168.12	82.69	9062.39	24.48	290.95
8	12559.96	0.00	316.39	155.06	261.34	196.88	73.73	210.82	552.94	236.28	118.48	12698.62	32.77	394.39
9	13597.42	0.00	350.11	164.75	277.68	209.18	83.07	223.99	623.03	255.26	125.88	13753.66	36.92	439.57
10	13393.39	0.00	344.74	162.33	273.59	206.11	81.77	220.70	613.29	251.43	124.03	13547.19	36.34	432.78
11	14109.20	0.00	354.79	174.45	294.01	221.49	82.55	237.17	619.13	265.46	133.28	14264.46	36.69	442.00
12	12143.84	0.00	293.40	155.06	261.34	196.88	65.92	210.82	494.37	229.34	118.48	12267.81	29.30	360.55
13	14126.40	0.00	322.31	188.18	317.15	238.92	68.53	255.83	514.00	268.12	143.77	14255.29	30.46	387.89
14	13154.72	0.00	317.78	167.98	283.12	213.28	71.39	228.38	535.41	248.43	128.35	13288.99	31.73	390.51
15	11927.13	0.00	303.06	146.18	246.37	185.60	71.13	198.74	533.47	224.19	111.69	12060.91	31.61	378.85
16	10993.47	0.00	294.73	128.41	216.42	163.04	72.17	174.58	541.25	205.55	98.11	11129.21	32.07	374.77
17	10222.30	0.00	273.76	119.53	201.45	151.76	66.98	162.50	502.31	191.15	91.32	10348.27	29.77	347.98
18	11722.94	0.00	242.61	166.37	280.40	211.23	46.21	226.19	346.56	224.27	127.11	11809.84	20.54	280.61
19	13631.72	0.00	253.68	205.14	345.73	260.45	41.54	278.89	311.51	262.80	156.73	13709.84	18.46	279.10
20	15250.04	0.00	264.43	237.44	400.18	301.47	38.16	322.81	286.20	295.37	181.42	15321.82	16.96	280.08
21	13631.68	0.00	237.94	211.60	356.62	268.66	34.79	287.68	260.89	263.91	161.67	13697.10	15.46	252.97
22	11453.12	0.00	208.03	174.45	294.01	221.49	32.71	237.17	245.32	221.16	133.28	11514.64	14.54	226.02
23	9682.61	0.00	181.00	145.37	245.01	184.57	29.85	197.64	223.90	186.61	111.07	9738.75	13.27	199.60
24	7281.36	0.00	150.59	103.38	174.23	131.25	28.66	140.54	214.94	139.30	78.98	7335.26	12.74	174.14

5.2. Results

GA, APSO and BRO algorithms are used to find suitable DGs for loss minimization and system stability by searching out minimum value of MO for each hour. The parameters used by each algorithm is listed down in **Table 12**. The whole procedure is discussed in previous chapter already. Loss minimization procedure is carried out for 20 times therefore all results are average of twenty times results. Three optimum size of DGs are placed in CIGRE model by each algorithm whereas DGs optimum size and location are in **Table 8**. The locations of DGs by each algorithm is listed in table are locations obtained maximum times out of 20 results whereas the DGs sizes are average of 20 results taken in kilos. The active and reactive power of DGs are same and expressed in KW and KVAR respectively in **Table 8**. The average total fitness value obtained by each algorithm is described in **Table 9**. The scenarios in each figure are also the hours of the day.

5.2.1. MO

Multi-Objective-Index (MO) value is calculated for each scenario i.e. each hour of the day using equation (24) at step 3. For Each scenario, ten best minimum MO values are obtained at each scenario using APSO, BRO and GA algorithm to find suitable size of DGs for that scenario while best minimum MO values calculated by each algorithm for specific scenario are shown in Figure 64: MO Curves. The suitable size of DGs obtained at each scenario are further placed in the system one by one to calculate MO value at step 6 of methodology for each scenario for finding fitness value of that DG for all scenarios while these MO values are listed down in **Table 16**, **Table 18** and **Table 20** calculated using BRO, APSO and GA algorithm respectively.

5.2.2. Fitness value

The fitness value of all DGs during each scenario are calculated at step 7 of methodology using equation (35) which are listed in **Table 17**, **Table 19** and **Table 21** using BRO, APSO and GA algorithm respectively. The left most column shows DG number at which fitness values are calculated whereas the columns S1 to S24 shows fitness value of specific DG at scenario 1 to senior 24.

5.2.3. Total Fitness value

The total fitness value of all DGs are calculated at step 8 of methodology using equation (36) by summation of fitness values at each scenario of specific DG. The total fitness value of selected DGs for all scenarios using APSO, GA and BRO are 6.39, 6.69 and 6.48 respectively. The total fitness values are listed in **Table 13**, **Table 14** and **Table 15** using APSO, GA and BRO algorithm respectively. The left most column shows DG number at which total fitness values are calculated while S1 to S24 shows total fitness values at specific best DGs of each scenario obtained at step 4 of methodology.

5.2.4. Active Power Losses Results

The curves of total system active losses are shown in Figure 8 for each scenario i.e. for each time of a day. Sky colour denotes the total actual active losses of the system before placement of DG which clearly shows that maximum losses are 51604.96 KW at 19^{th} scenario that are minimized to 25471.47, 23123.32 and 22925.5 KW value by allocation of DGs in the system using APSO, BRO and GA algorithms respectively. The average of total active power losses are 12502.73, 11794.15 and 11743.23 KW after placement of DGs in the distribution system APSO, BRO and GA algorithms respectively. The total active-power-losses at scenario 2 to 4 are less than as compare to placement of DGs with different algorithms. As the method is applied to allocate DGs in the system while considering all scenarios to reduce overall total losses in the system so selected DGs with their suitable size are delivering same power for a whole day whereas power demand for a system for scenario two to scenario four are less as compare to dispatch power to the system which results in the form of increment in losses. The maximum total active system losses (for all scenarios) lies after DGs allocation using APSO, GA and BRO are 300065.4KW, 281838KW and 283059.7 KW respectively which is almost 53.03, 55.88 and 55.89 % reduction in losses as compare to actual system whereas maximum minimized total reactive losses (for all scenarios) are 331534.010 KVAR by BRO algorithm which 48.47% reduction in reactive losses as compare to actual system while total losses with other algorithms are listed in **Table 9** . The figure also shows the total active loss minimization by each algorithm.

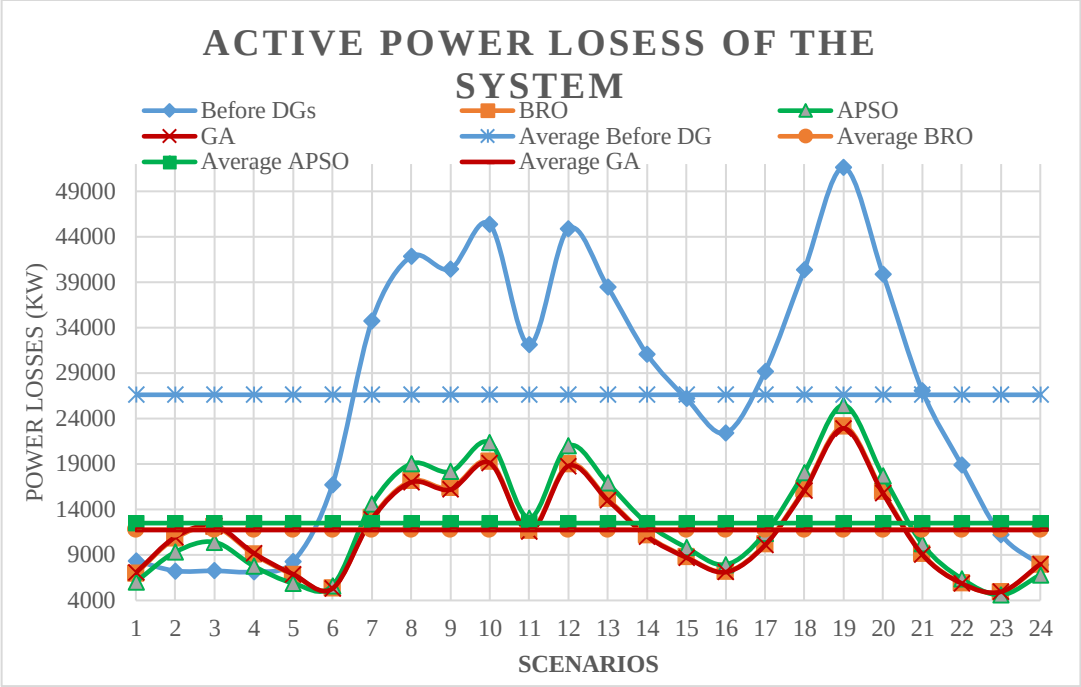

Figure 8: Active Power Losses Curve

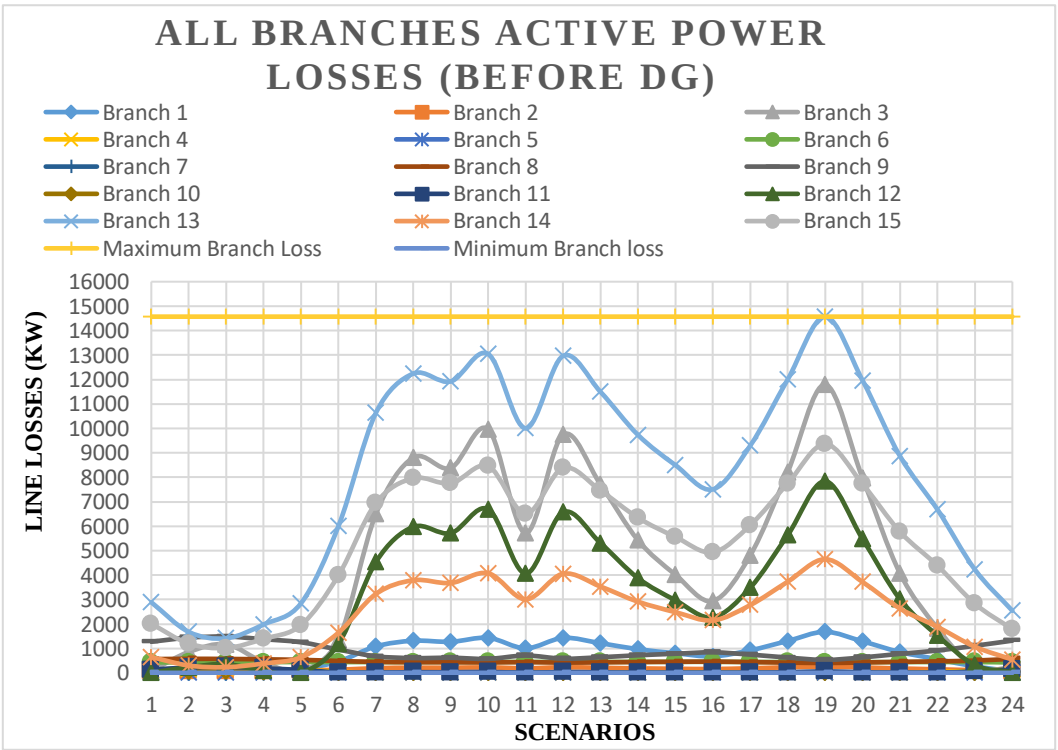

Figure 9: Branch Active Power Losses (Before DG)

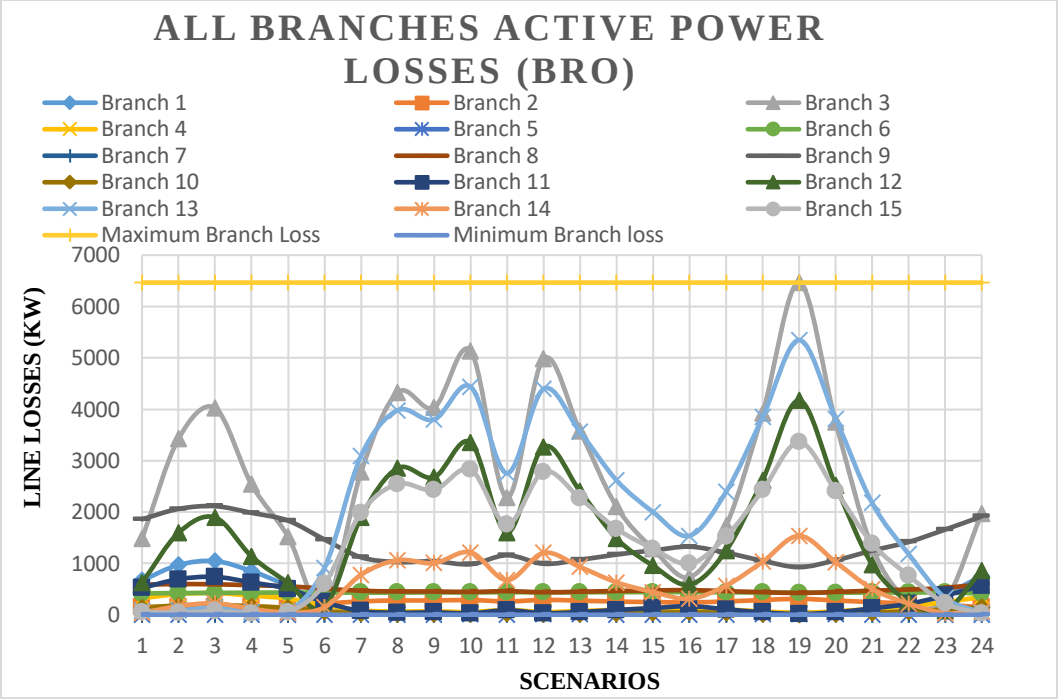

Figure 10: Branch Active Power Losses (BRO)

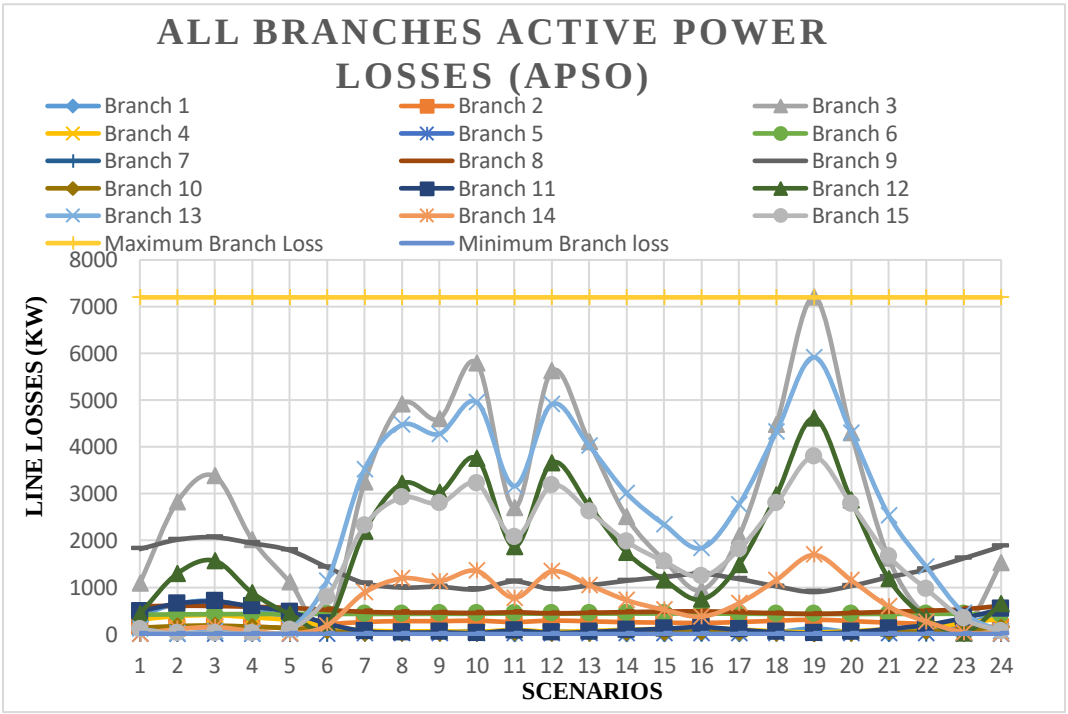

Figure 11: Branch Active Power Losses (APSO)

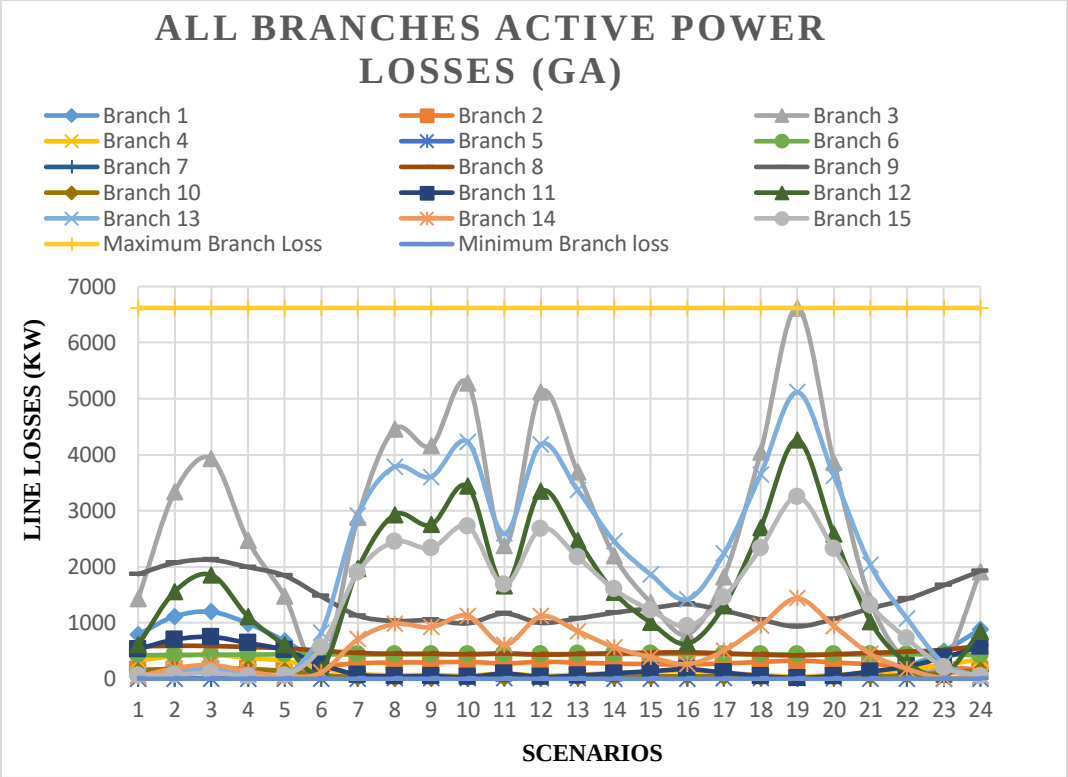

Figure 12: Branch Active Power Losses (GA)

5.2.4.1. Active Losses along Branches

The actual whole day active losses curves of all branches are shown in Figure 9 whereas their active losses curves after placing DGs using BRO, APSO and GA are shown in, Figure 10, Figure 11 and Figure 12 respectively. The losses curves in Figure 10 to Figure 12 shows that the losses occurs at 1am to 5am are high as compare to actual active losses of the system because of excessive active power is delivered as compare to demand at that time instant.. The peak loss of 14569.43 KW lies in branches of actual system which are minimized up to 6619.197, 7199.756 and 6465.435 KW in case of DGs allocation using GA, APSO and BRO respectively whereas minimum loss of 0.346432 KW in branches of actual system are increased up to 1.392466, 1.45 and 1.384796 KW using GA, APSO and BRO respectively which are expressed in Table 9.

The performance of method is also checked on each branch for all scenarios separately. The active loss curves of branch 1 to branch 15 are shown in Figure 13 to Figure 27 respectively whereas their average values along all scenarios are listed down in **Table 7**. The average KW

losses across branch 3, 7 and 12 are minimum by using BRO algorithm for allocation of DGs whereas average active losses at 1, 2, 4, 5, 6, 9, 10 and 11 branch are least in case of APSO algorithm while GA have better performance by maximum minimizing losses at branch 8, 13, 14 and 15.

The maximum loss occurs at branch 1 is 1677.4 (KW) at 19th scenario without DG which is reduced up to 54.38057 KW, 121.279 KW and 45.49828 KW losses at same scenario using BRO, APSO and GA algorithm. The average active losses of branch 1 are 789.36 KW, 263.176 KW, 163.37 KW and 320.1207 KW at without DG, BRO, GA and APSO algorithm which shows that there is remarkable change occurs in loss minimization. The curve also shows that losses from 12 am to 5 am are higher in case of DG placement which is due to deliverance of power to the system at that specific scenarios are more than its demand.

The maximum loss occurs at branch 2 is 259.7011 (KW) at 19th scenario without DG whereas instead of loss minimization peak loss is increased up to 312.3759 KW, 308.946 KW and 325.9605 KW losses using BRO, APSO and GA algorithm. The losses occurs with algorithms are higher as compare to losses without DG as the branch is associated with bus 2 having no load while DG is mostly allocated at bus 2 or bus 1 therefore losses increases because of delivering power more than its demand. The average active losses of branch 2 are 159.88 KW, 235.1377 KW, 230.02 KW and 249.0541 KW at without DG, BRO, GA and APSO algorithm.

The peak reactive loss occurs at branch 3 is 11788.85 (KW) at 19th scenario without DG which is reduced up to 6465.435 KW, 7199.756 KW and 6619.197 KW losses using BRO, APSO and GA algorithm. The average active losses for all scenarios of branch 3 are 4678.45 KW, 2671.153 KW, 2724.102 KW and 2845.17 KW at without DG, BRO, GA and APSO algorithm which is the indication of remarkable reduction in loss minimization. The maximum loss occurs at branch 4 is 191.10 (KW) at 3am without DG which is minimized through BRO, APSO and GA algorithms up to 425.0873 KW, 406.0 KW and 428.5965 KW losses occurs. The active losses occurs after placement of DGs are higher as compare to losses without DG. The average active losses for 24 hours of branch 4 are 50.13 KW, 170.1771 KW, 158.84 KW and 172.422KW at without DG, BRO, GA and APSO algorithms respectively.

The actual minimum active losses of the system at branch 5 and 6 are 8.152366 and 424.2876 KW respectively whereas their peak losses are 11.05156 and 451.3684 KW which are maximum reduced up to 10.397 and 439.489 KW through APSO as compare to other two algorithms. The average reactive losses at branch 7 are 1.6751482, 1.567325, 1.54268 and 1.597625 KW at without DG, BRO, GA and APSO algorithms.

Table 7: Average Active Power Losses of Branches

Average Active Power Losses of Branches (KW)

Algorithms	*Branch 1*	*Branch 2*	*Branch 3*	*Branch 4*	*Branch 5*	*Branch 6*	*Branch 7*	*Branch 8*	*Branch 9*	*Branch 10*	*Branch 11*	*Branch 12*	*Branch 13*	*Branch 14*	*Branch 15*
Before DG	789.4	159.9	4678.5	50.1	9.7	442.7	1.7	473.2	882.7	14.4	59.0	3214.7	8124.1	2405.8	5312.2
GA	320.1	249.1	2724.1	172.4	9.3	437.6	1.5	488.2	1381.5	68.8	239.8	1697.0	2074.6	535.3	1343.9
APSO	163.4	230.0	2845.2	158.8	9.1	431.0	1.6	500.7	1337.9	60.5	212.8	1792.6	2489.7	642.7	1626.6
Proposed BRO	263.2	235.1	2671.2	170.2	9.2	434.3	1.5	495.6	1374.3	67.0	234.5	1661.6	2194.6	584.0	1398.0

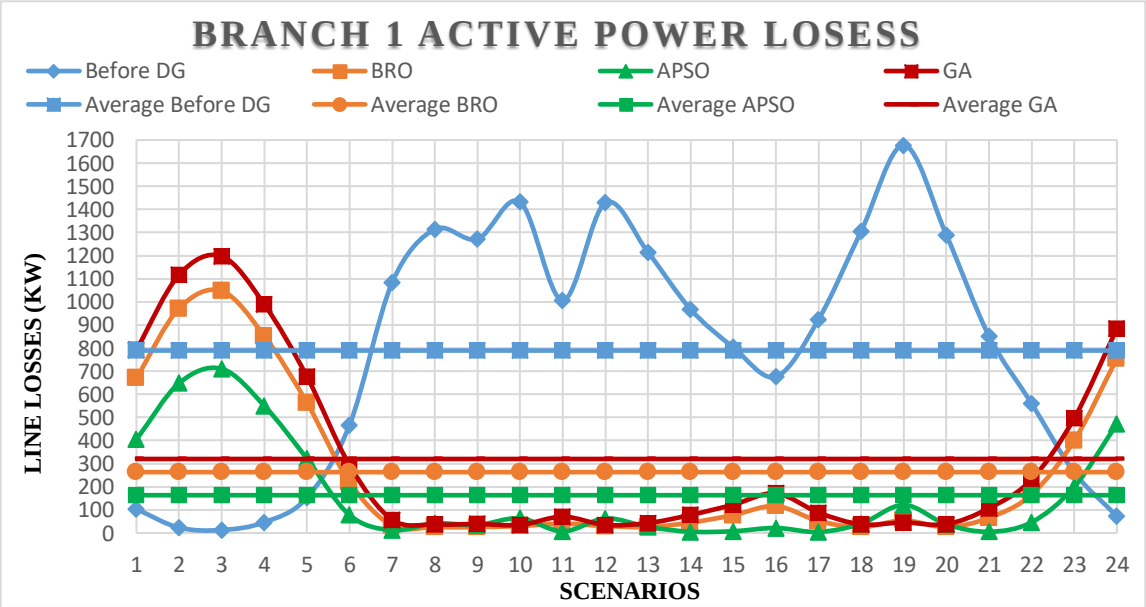

Figure 13: Branch 1 Active Power Losses Curve

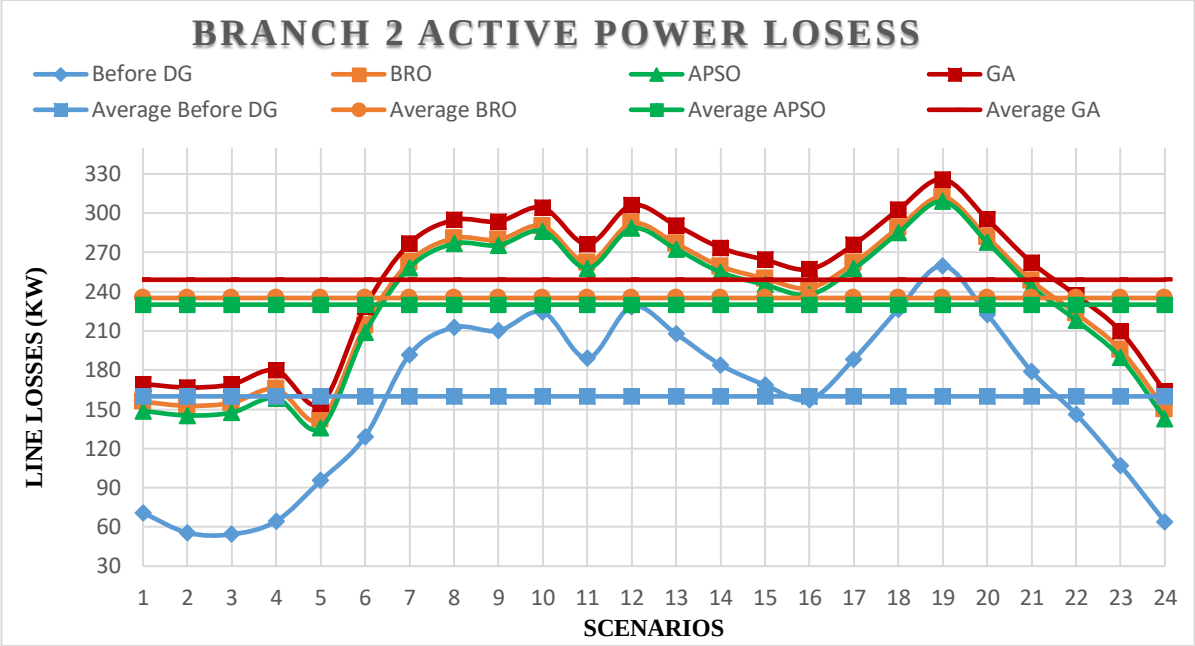

Figure 14: Branch 2 Active Power losses Curve

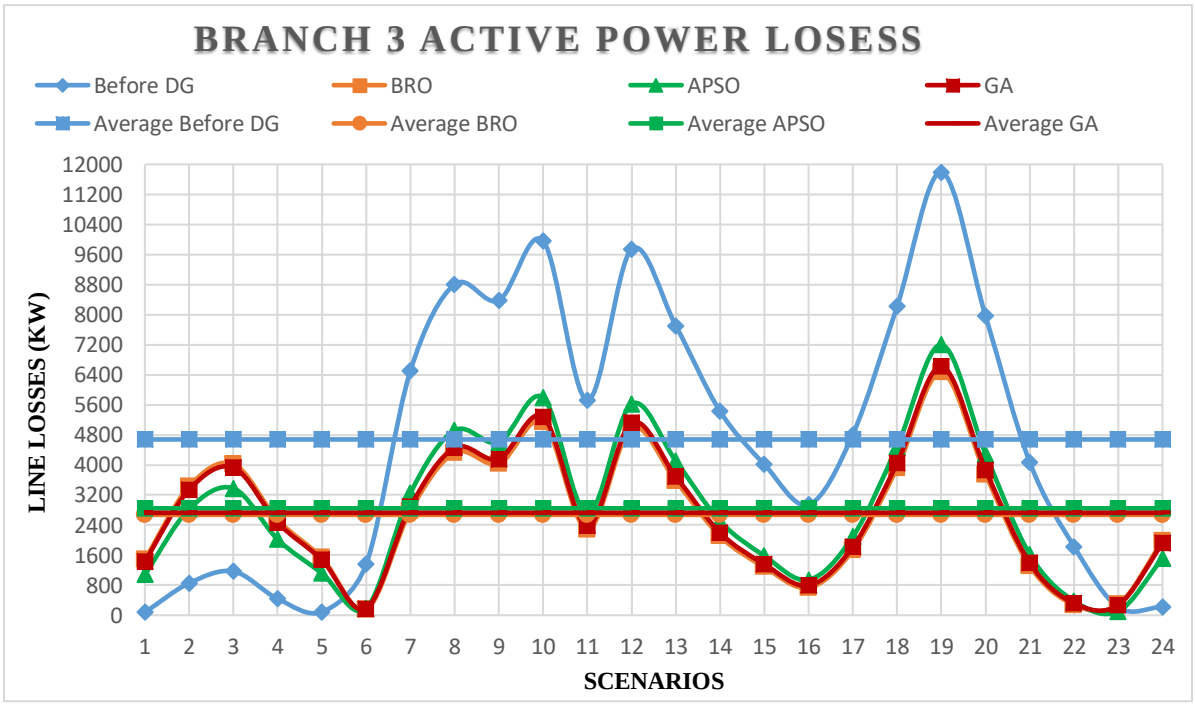

Figure 15: Branch 3 Active Power Losses Curve

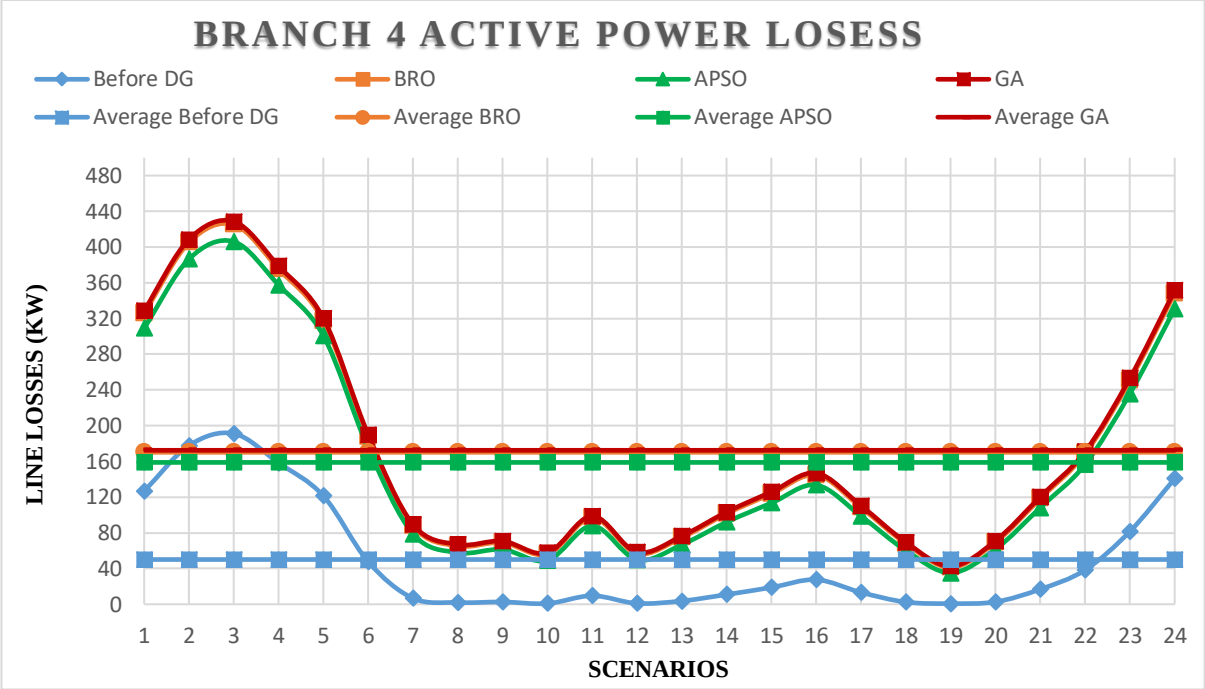

Figure 16: Branch 4 Active Power Losses Curve

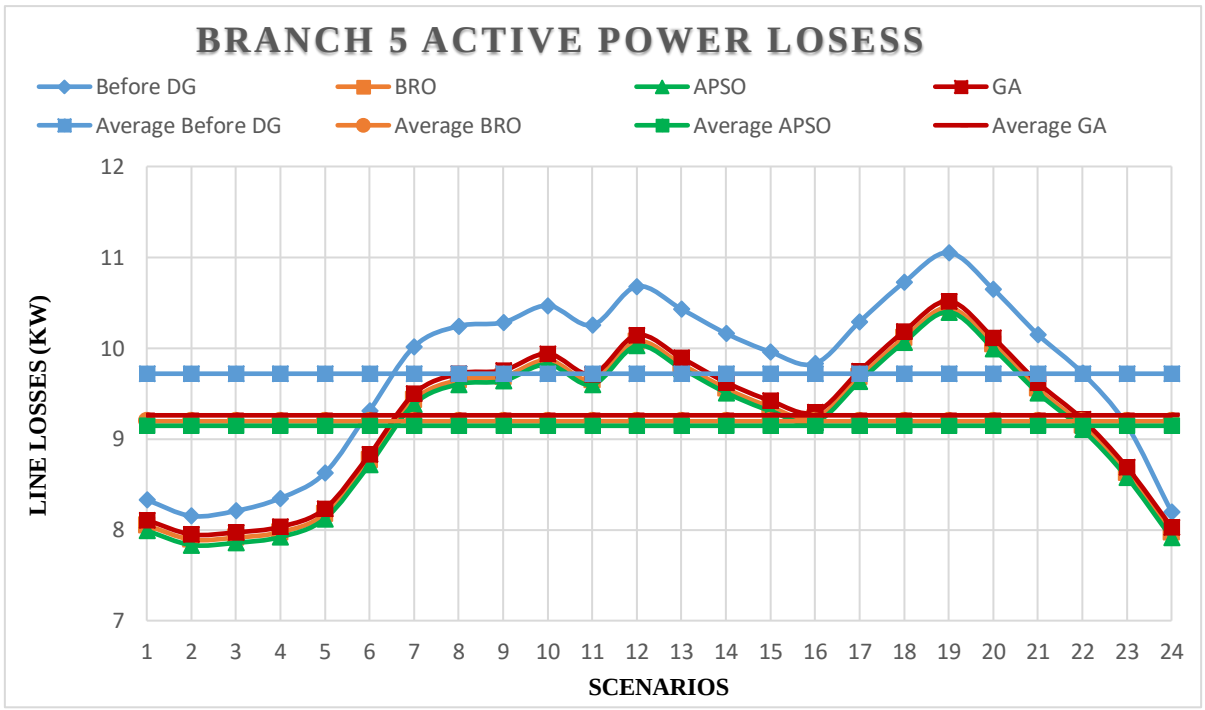

Figure 17: Branch 5 Active Power Losses Curve

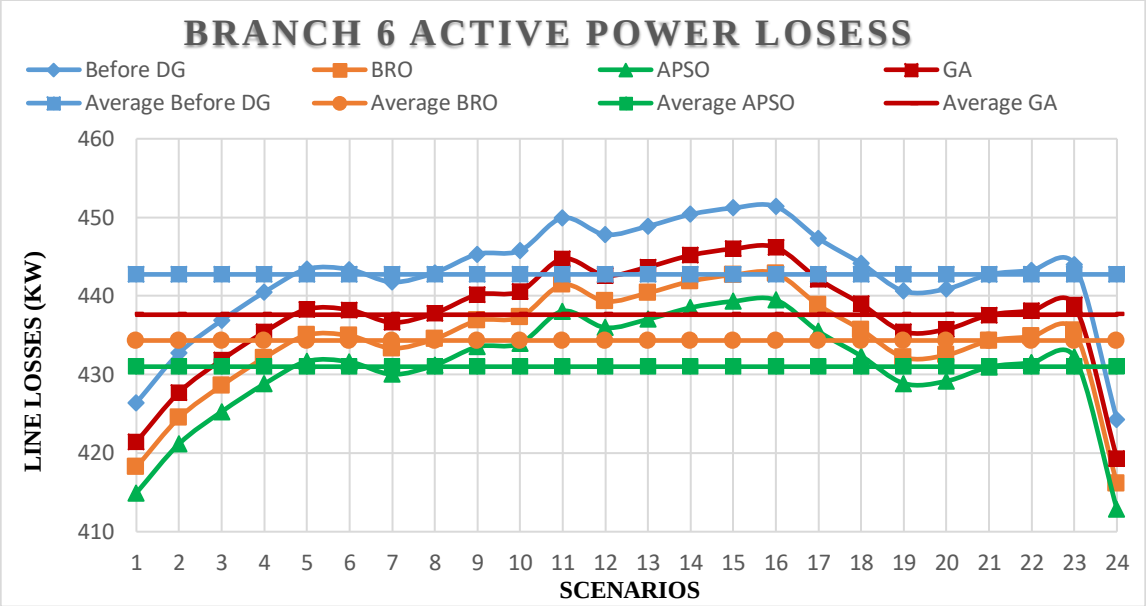

Figure 18: Branch 6 Active Power Losses Curve

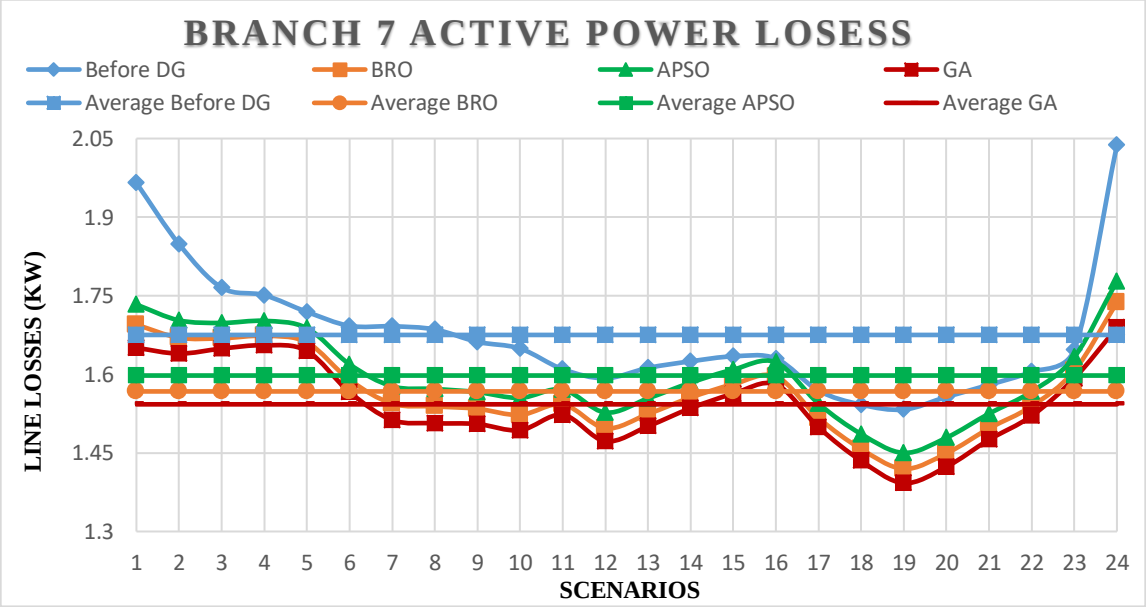

Figure 19: Branch 7 Active Power Losses Curve

The active loss occurs at branch 8 to branch 11 are shown in Figure 20 to Figure 23. The curves show that peak and average active losses after placement of DGs are higher than losses without DGs as branch 8 to branch 11 are interconnected and having small lengths and larger loads are connected to each bus associated with these branches, in the mean while the DGs are mostly not

placed among bus 8 to bus 11 therefore reactive losses increases maybe.The peak active losses at branch 12 are reduced up to 4174.382, 4618.399 and 4262.017 KW whereas at branch 13 peak active losses are minimized up to 5348.353, 5919.118 and 5115.509 KW using BRO, APSO and GA algorithm respectively. The average active power losses are 583.9606, 642.7453 and 535.3487 KW at branch 14 using BRO, APSO and GA algorithm while average reactive losses for 24 hours of branch 15 are 5312.1867, 1397.996, 1343.854 and 1626.586 KW at without DG, BRO, GA and APSO algorithms.

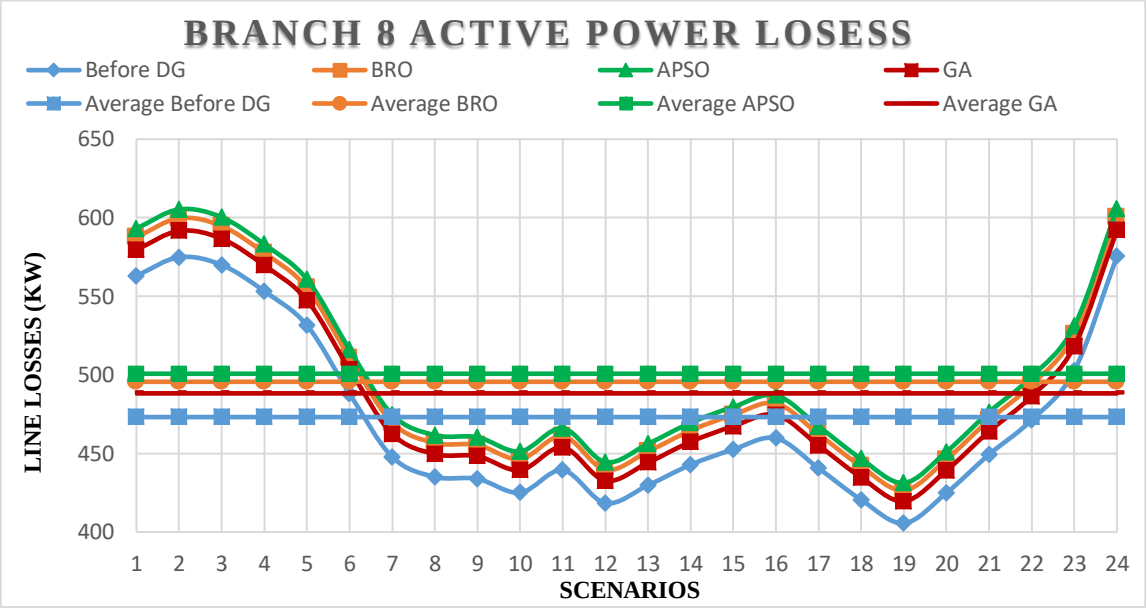

Figure 20: Branch 8 Active Power Losses Curve

Table 8: Best DGs Sizes and Locations

Best DGs Sizes and Locations

Algorithms	*DG 1 Location*	*DG 2 Location*	*DG 3 Location*	*DG 1 Size(*1000)*	*DG 2 Size(*1000)*	*DG 3 Size(*1000)*
GA	1	12	2	181.1191	62.5677	10.50297
APSO	1	12	2	208.6437	70.11688	33.40979
Proposed BRO	1	12	2	200.2209	69.16788	29.1523

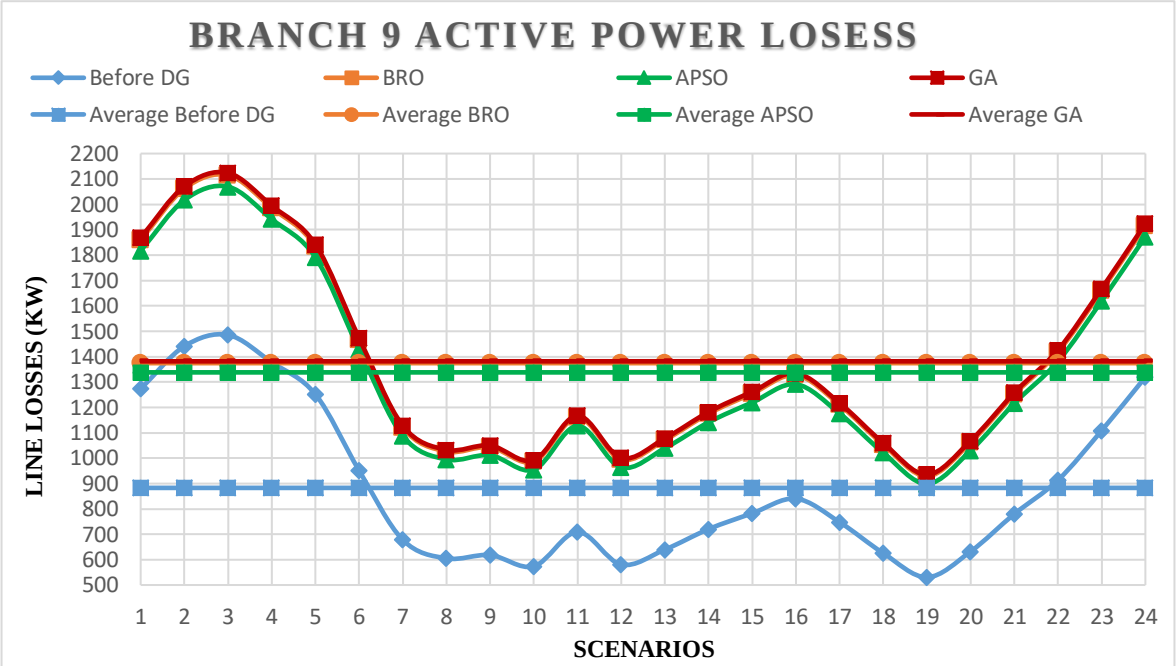

Figure 21: Branch 9 Active Power Losses Curve

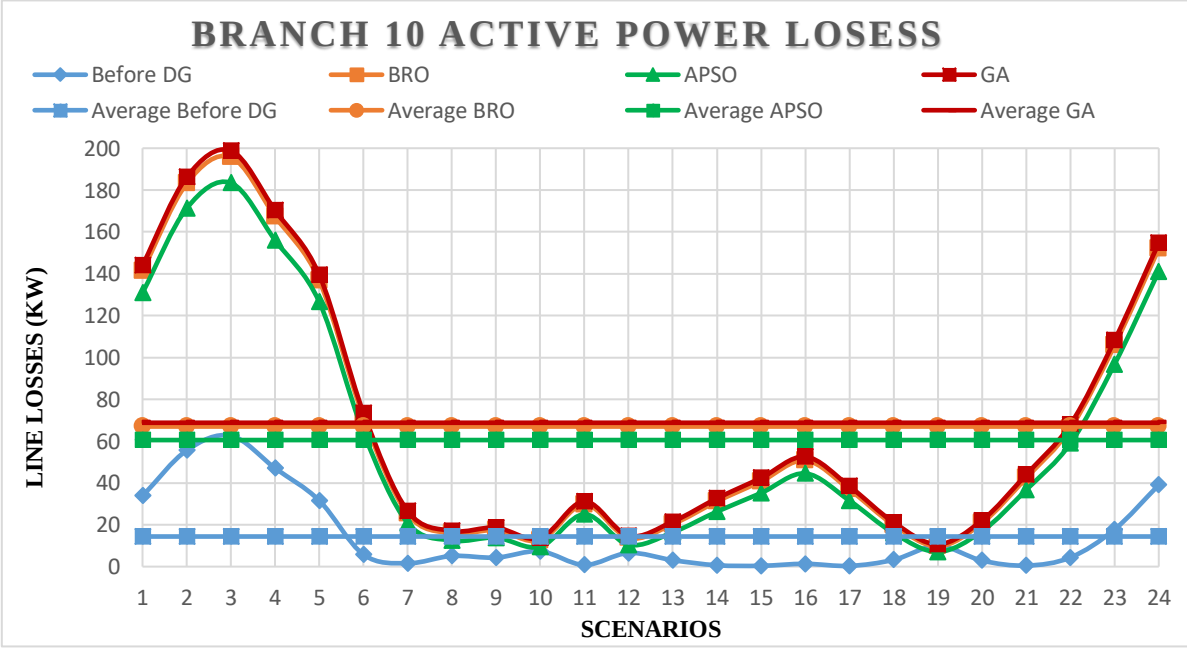

Figure 22: Branch 10 Active Power Losses Curve

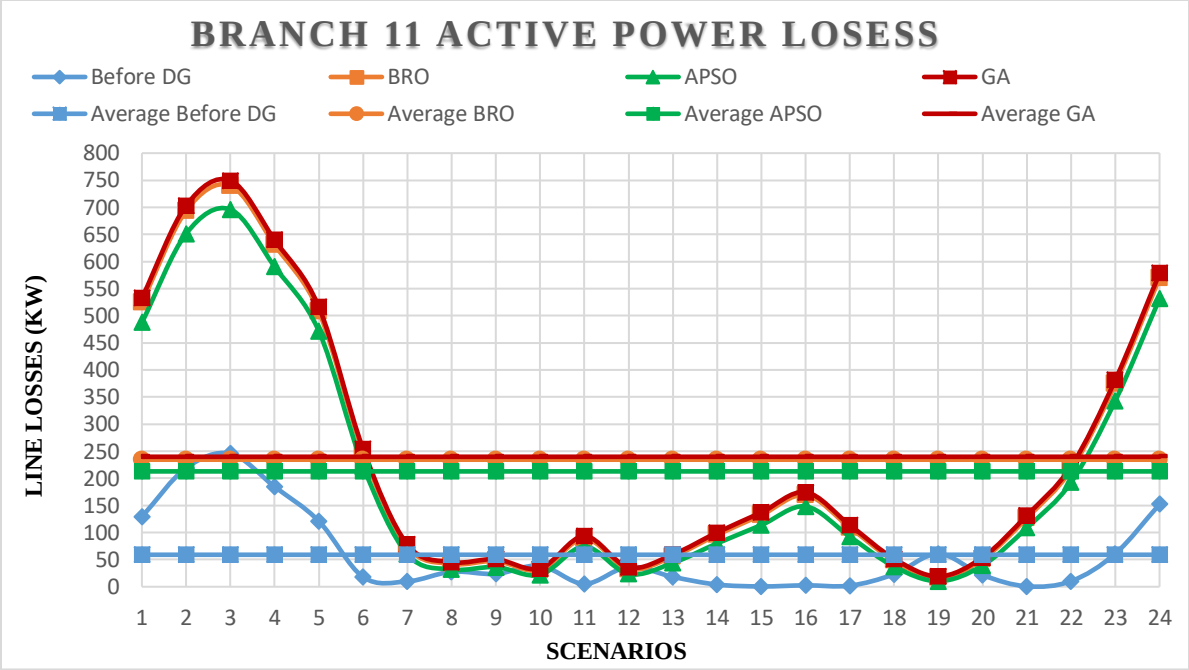

Figure 23: Branch 11 Active Power Losses Curve

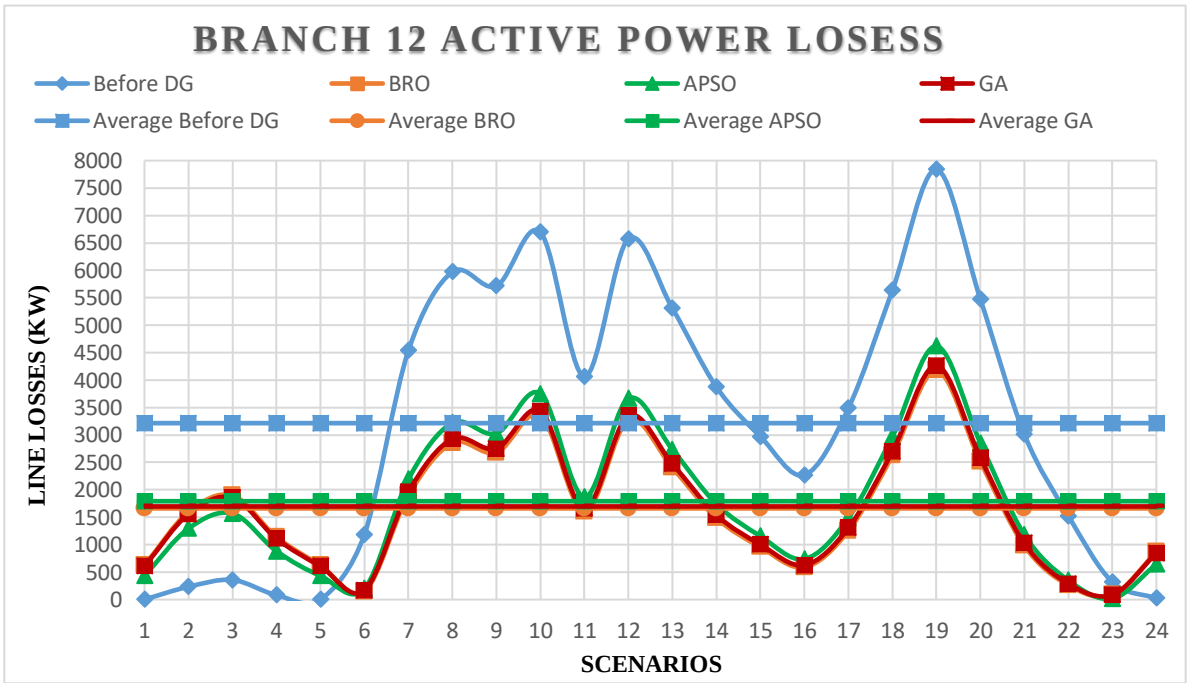

Figure 24: Branch 12 Active Power Losses Curve

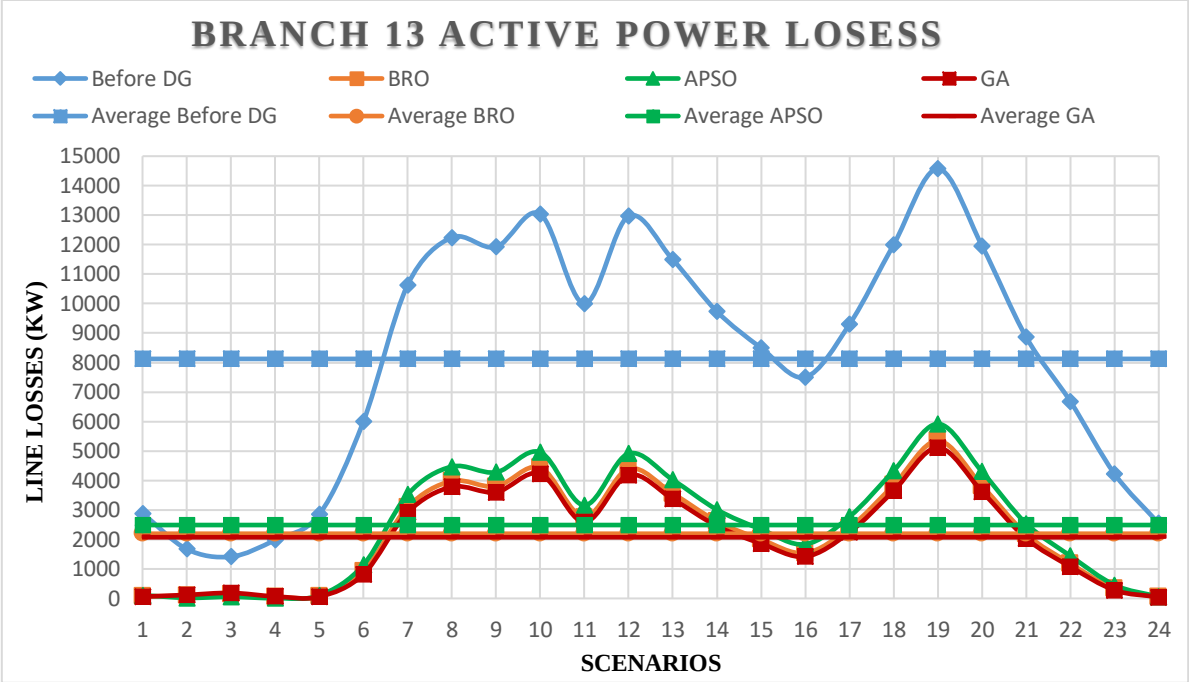

Figure 25: Branch 13 Active Power Losses Curve

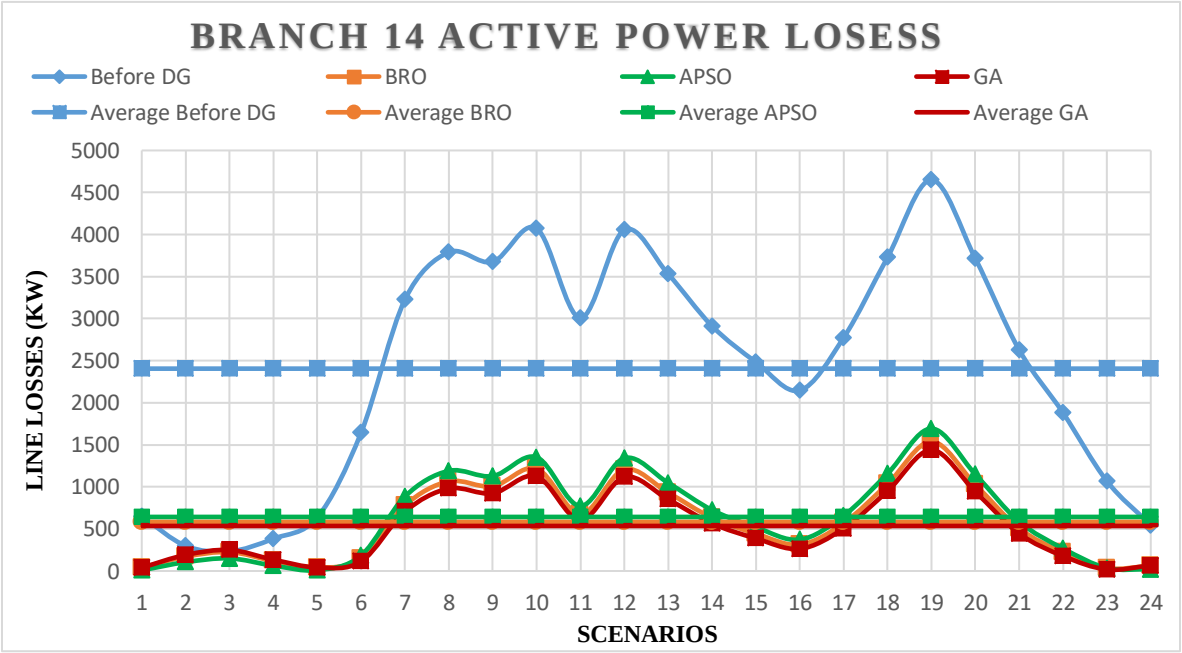

Figure 26: Branch 14 Active Power Losses Curve

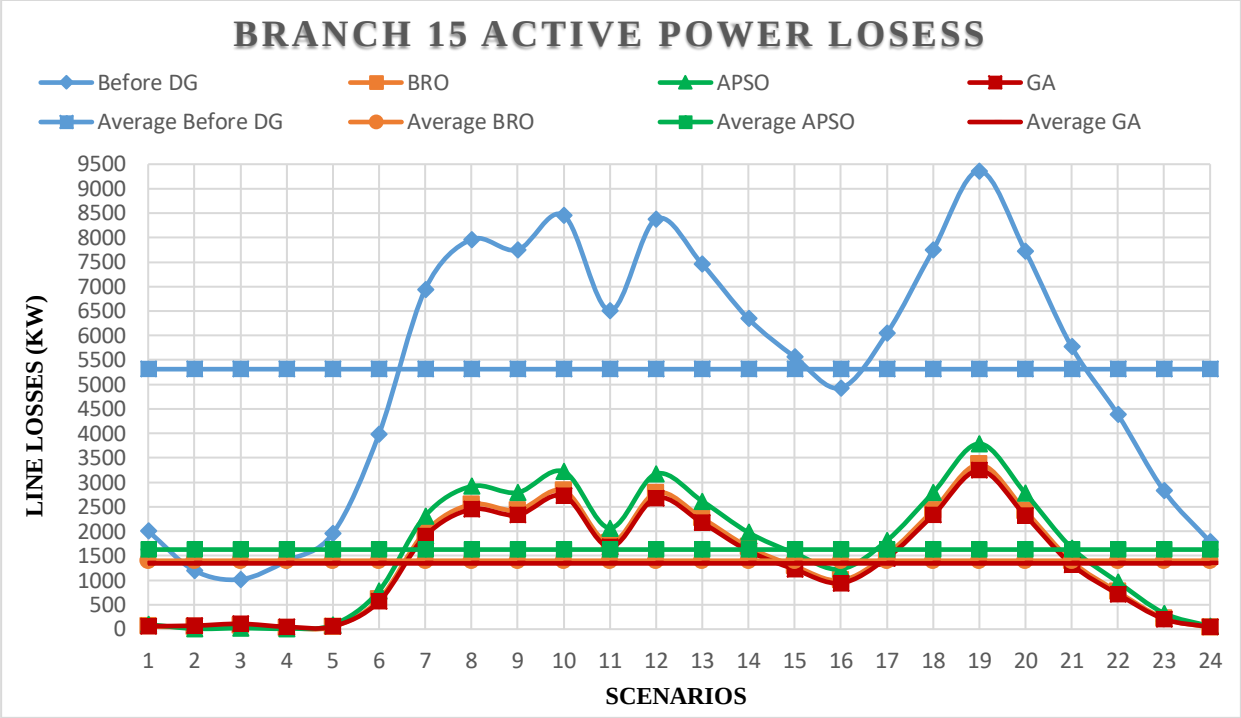

Figure 27: Branch 15 Active Power Losses Curve

Table 9: Results

Algorithm	Total Fitness	Total Active Losses (All Scenarios) (KW)	Total Reactive Losses (All Scenarios) (KVAR)	V min PU	V max PU	Min Line Losses (P,Q) (KW,KVAR)	Max Line Losses (P,Q) (KW,KVAR)	P loss (%) Red	Q loss (%) Red
Before DG	-	638830.3	643331.893	0.4622	1.0958	0.346432, 0.498524	14569.43, 16907.7	-	-
APSO	6.39	300065.4	345903.590	0.7056	1.2159	1.45, 2.074574	7199.756, 10325.97	53.03	46.23
GA	6.69	281838	335994.102	0.7326	1.2269	1.392466, 1.992093	6619.197, 9493.322	55.88	47.77
Proposed BRO	**6.48**	**283059.7**	**331534.010**	**0.7261**	**1.2250**	**1.384796, 1.98112**	**6465.435, 9272.794**	**55.69**	**48.47**

5.2.5. Reactive Power Losses Results

The curves of total system reactive losses are shown in Figure 28 for each scenario while power losses are expressed in KVAR. Maximum total reactive losses are 53490.16 KVAR at 19th scenario which are minimized up to 28191.04, 25669.27 and 25836.27 KVAR value by allocation of DGs in the system using APSO, BRO and GA algorithms respectively. The average of total reactive power losses are 14412.65, 13813.92 and 13999.75 after placement of DGs in the distribution system APSO, BRO and GA algorithms respectively. The total reactive losses at scenario 1 to 5 are less in case of before DG as compare to placement of DGs with different algorithms. As the method is applied to allocate DGs in the system while considering all scenarios to reduce overall total losses in the system so selected DGs with their suitable size are delivering same power for a whole day whereas power demand for a system for scenario one to scenario five are less as compare to dispatch power to the system which results in the form of increment in losses. The figure also shows the total active loss minimization by each algorithm whereas total losses of system at all scenarios are expressed in **Table 9**.

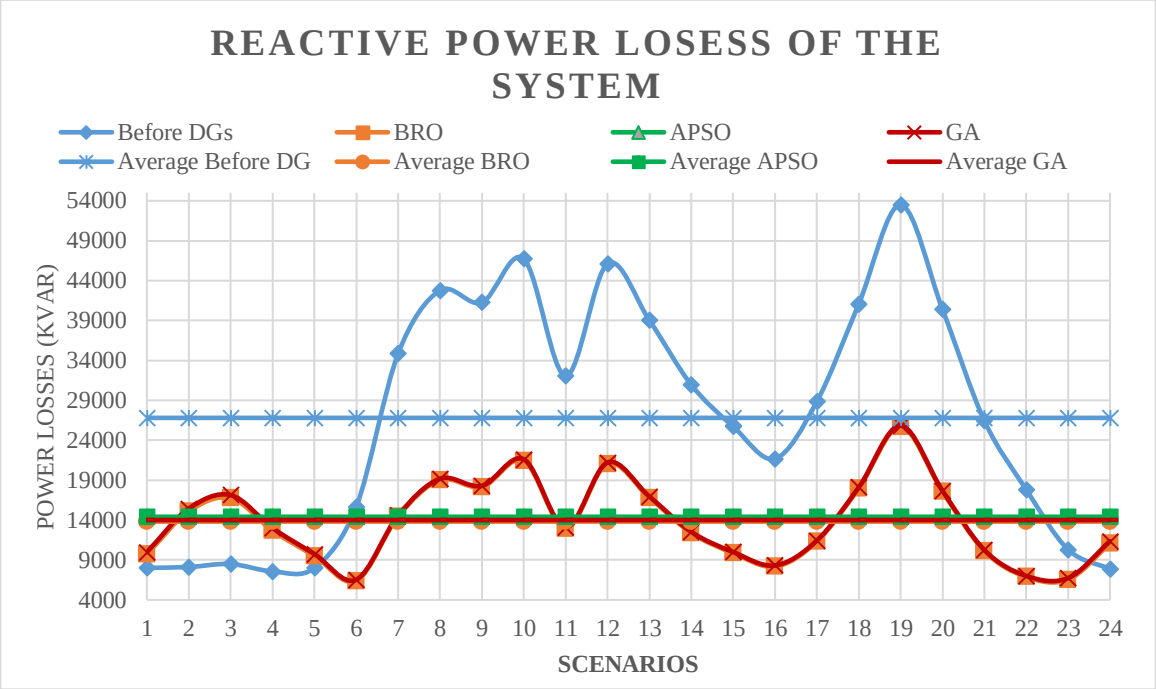

Figure 28: Reactive Power Losses Curve

5.2.5.1. Reactive Losses along branches

The actual whole day reactive losses curves of all branches are shown in Figure 29 whereas their daily reactive losses curves after placing DGs using APSO, BRO and GA are shown in Figure 30, Figure 31 and Figure 32 respectively. The losses curves in Figure 30 to Figure 32 shows that the losses occurs at 2am to 4am are high as compare to actual reactive losses of the system because of excessive reactive power is delivered at that scenarios as compare to demand. The occurrence 16907.7 KVAR of peak loss in branches of actual system is minimized up to 9493.322, 10325.97 and 9272.794 KVAR in case of DGs allocation using GA, APSO and BRO respectively whereas minimum loss of 0.498524 KVAR in branches of actual system are increased up to 1.98112, 2.074574 and 1.992093 KVAR using GA, APSO and BRO respectively which are expressed in Table 9.

The reactive loss curves along all scenarios of branch 1 to branch 15 are shown in Figure 33 to Figure 47 whereas their average value along all scenarios are listed down in Table 10. The average KVAR losses across branch 3, 5, 7, 12 and 13 are minimum by using BRO algorithm for allocation of DGs whereas average reactive losses at 1, 2, 4, 6, 9, 10 and 11 branch are least in case of APSO algorithm while GA have better performance by maximum minimizing losses at branch 8, 14 and 15 respectively. At Bus 2, 4, 8, 9, 10 and 11 the average KVAR losses are increased after proper allocation of DGs in the system through different algorithms.

The maximum loss occurs at branch 1 is 2399.68 (KVAR) without DG while 103.1082 KVAR, 173.501 KVAR and 45.82288 KVAR losses occurs at same time instant using BRO, APSO and GA algorithm. The average active losses of branch 1 are 1129.25 KVAR, 342.56 KVAR, 233.71 KVAR and 413.59 KVAR at without DG, BRO, GA and APSO algorithm which shows that there is remarkable change occurs in loss minimization. The curve also shows that losses from 12 am to 5 am are higher in case of DG placement which is due to deliverance of power to the system at that specific scenarios are more than its demand. There is huge difference in reactive losses among placement of DGs using BRO, APSO and GA at 3 am i.e. 1379, 1632 and 1016 KVAR losses respectively.

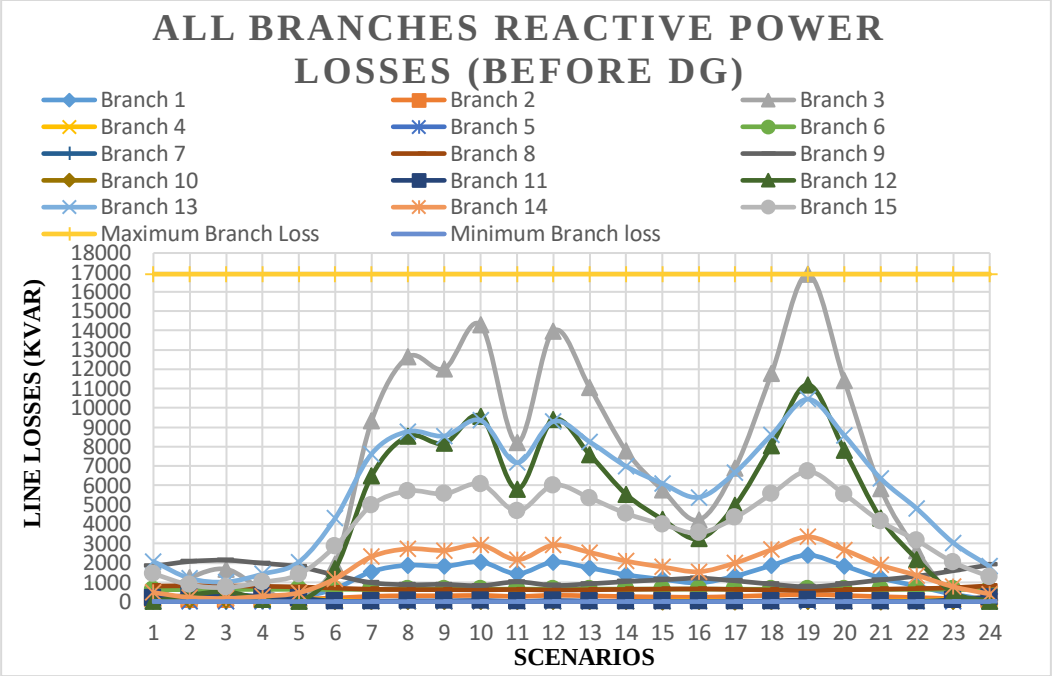

Figure 29: All Branches Reactive Power Losses Curve (Before DG)

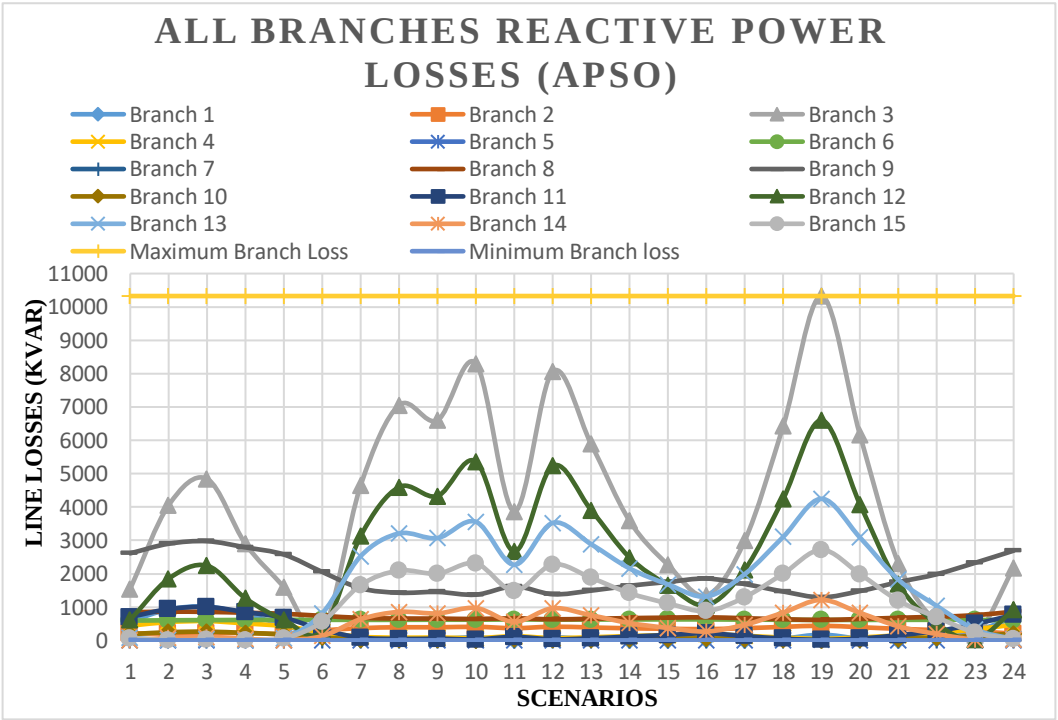

Figure 30: All Branches Reactive Power Losses Curve (APSO)

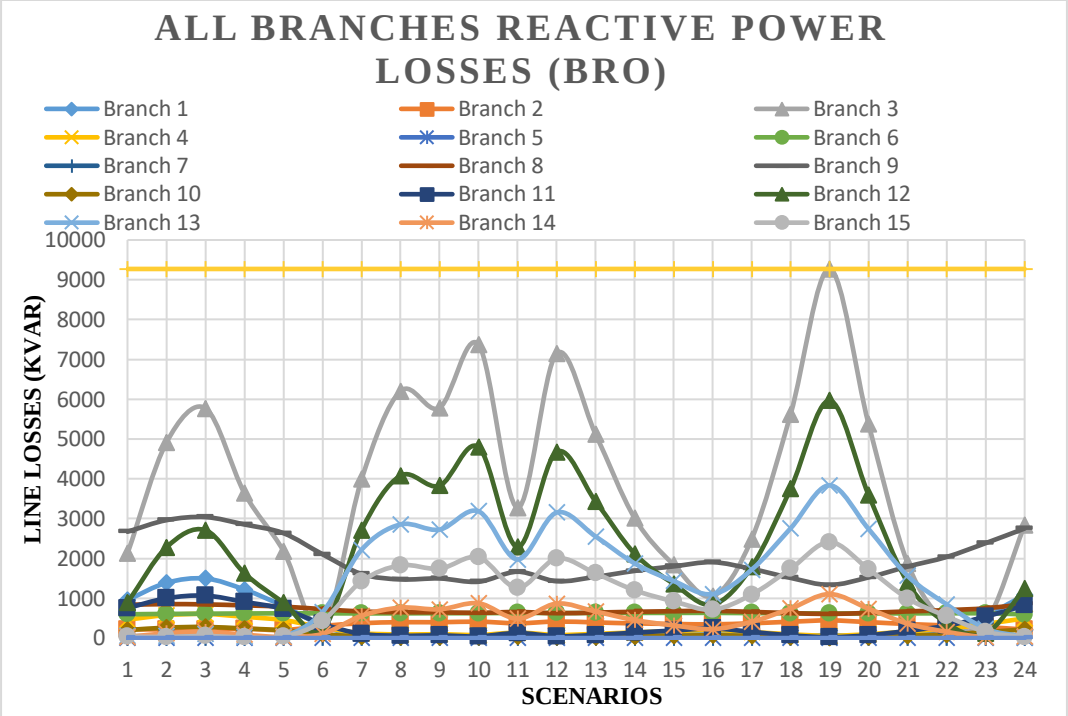

Figure 31: All Branches Reactive Power Losses Curve (BRO)

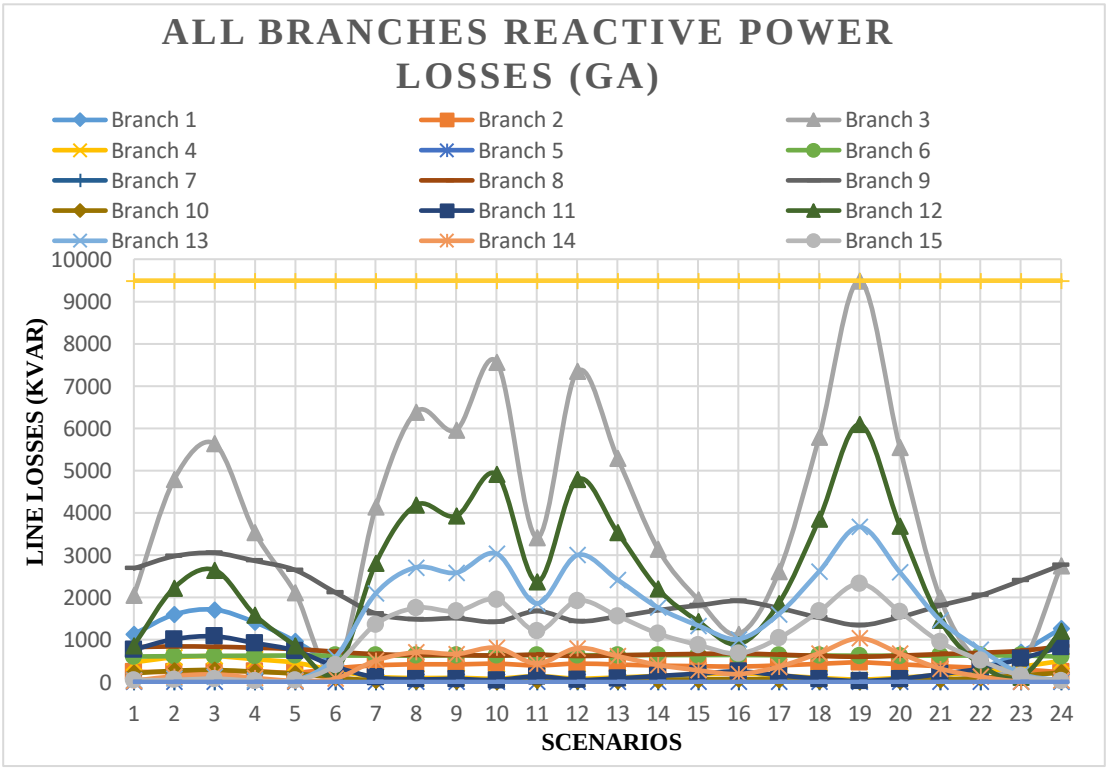

Figure 32: All Branches Reactive Power Losses Curve (GA)

Table 10: Average Reactive Power Losses of Branches

`Average Reactive Power Losses of Branches (KVAR)

Algorithms	*Branch 1*	*Branch 2*	*Branch 3*	*Branch 4*	*Branch 5*	*Branch 6*	*Branch 7*	*Branch 8*	*Branch 9*	*Branch 10*	*Branch 11*	*Branch 12*	*Branch 13*	*Branch 14*	*Branch 15*
Before DG	1129.3	228.3	6709.9	71.6	13.9	634.6	2.4	674.2	1268.8	20.7	85.1	4595.2	5829.0	1730.1	3812.3
GA	458.0	355.6	3906.9	246.3	13.2	627.2	2.2	695.8	1985.9	99.0	345.9	2425.8	1488.5	385.0	964.4
APSO	233.7	328.4	4080.6	226.9	13.1	617.8	2.3	713.6	1923.2	87.0	307.1	2562.4	1786.4	462.2	1167.3
Proposed BRO	376.5	335.7	3831.0	243.1	13.1	622.5	2.2	706.3	1975.5	96.4	338.2	2375.1	1574.6	420.0	1003.3

The maximum loss occurs at branch 2 is 370.8006 (KVAR) at scenario 19 before DGs whereas instead of loss minimization peak loss is increased up to 446.0096 KVAR, 441.1128 KVAR and 465.4057 KVAR using BRO, APSO and GA algorithm at same scenario. The reactive losses occurs after DGs placement are higher as compare to losses before placement of DGs as the branch is associated with bus 2 having no load while DG is mostly allocated at bus 2 or bus 1 therefore losses increases because of delivering power more than its demand. The average active losses of branch 2 are 228.2714721, 335.7291625, 328.4250333 and 355.599 KVAR at without DG, BRO, APSO and GA algorithm.

The peak reactive loss occurs at branch 3 is 16907.7 (KVAR) before DG which are reduced up to 9272.794, 10325.97 and 9493.322 KVAR losses at same time instant using BRO, APSO and GA. The curve of branch 4 also shows that losses with DGs are higher from 12 am to 5 am as compare to losses of actual system because of power that is delivered to the system more than its demand at that scenarios. The maximum loss occurs at branch 4 is 273.0087 (KVA) at 3am without DG which is minimized through BRO, APSO and GA algorithms up to 607.2675, 580.0621 and 612.2808 KVAR losses. The reactive losses occurs after placement of DGs are higher as compare to losses without DG i.e. average 160 KVA reactive loss is more than average loss without DG for 24 hours.

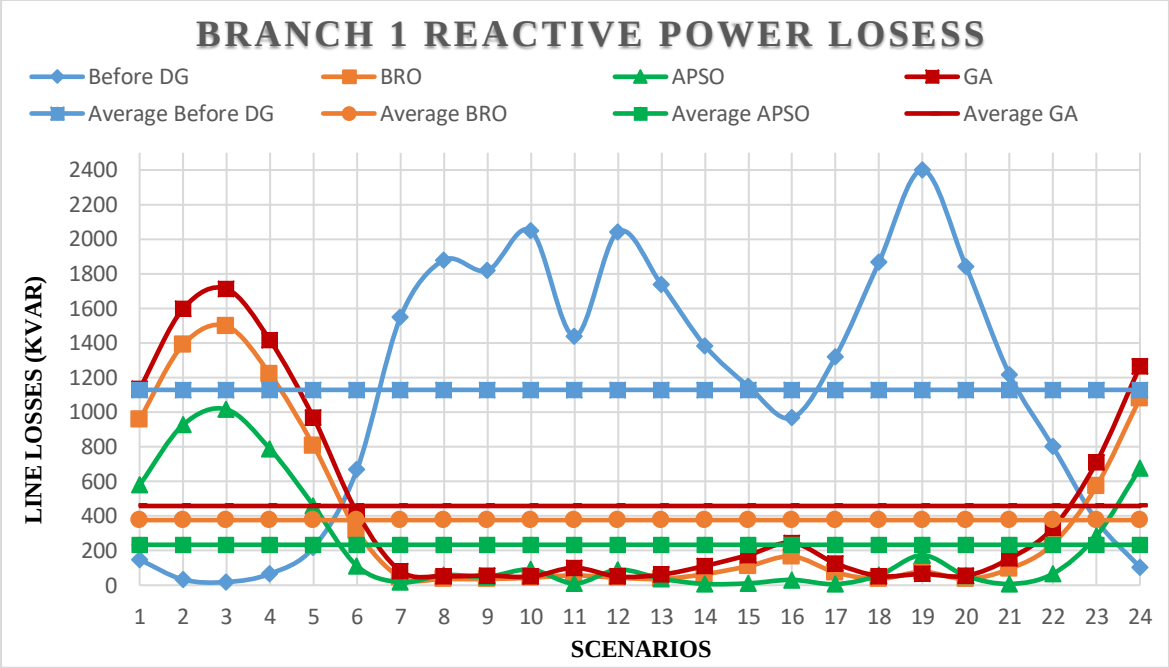

Figure 33: Branch 1 Reactive Power Losses

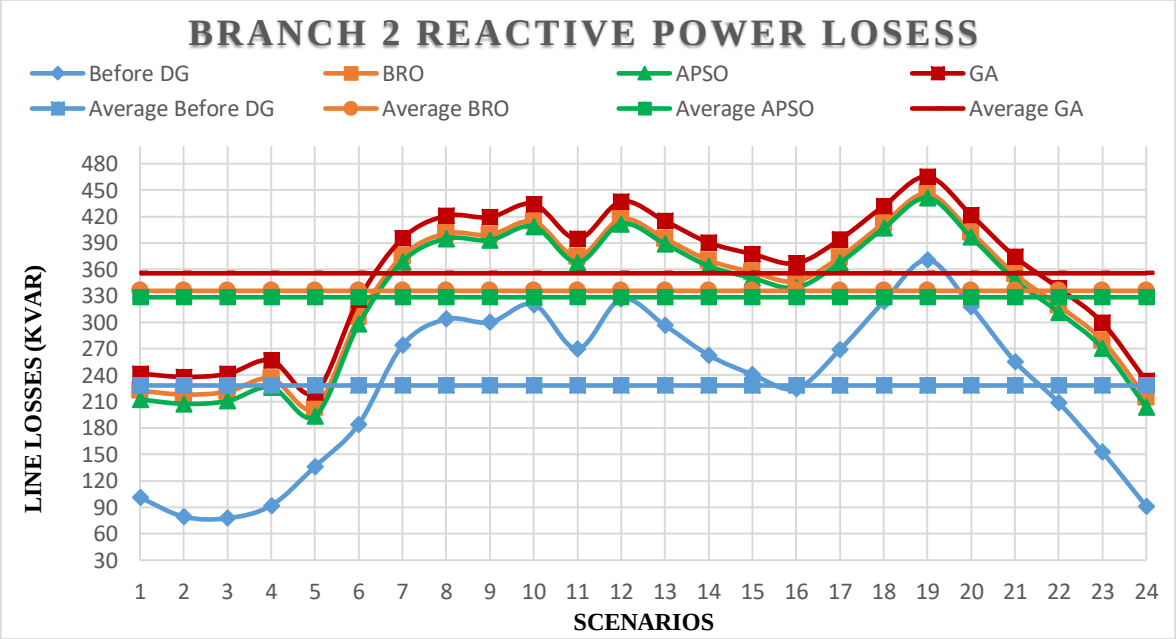

Figure 34: Branch 2 Reactive Power losses Curve

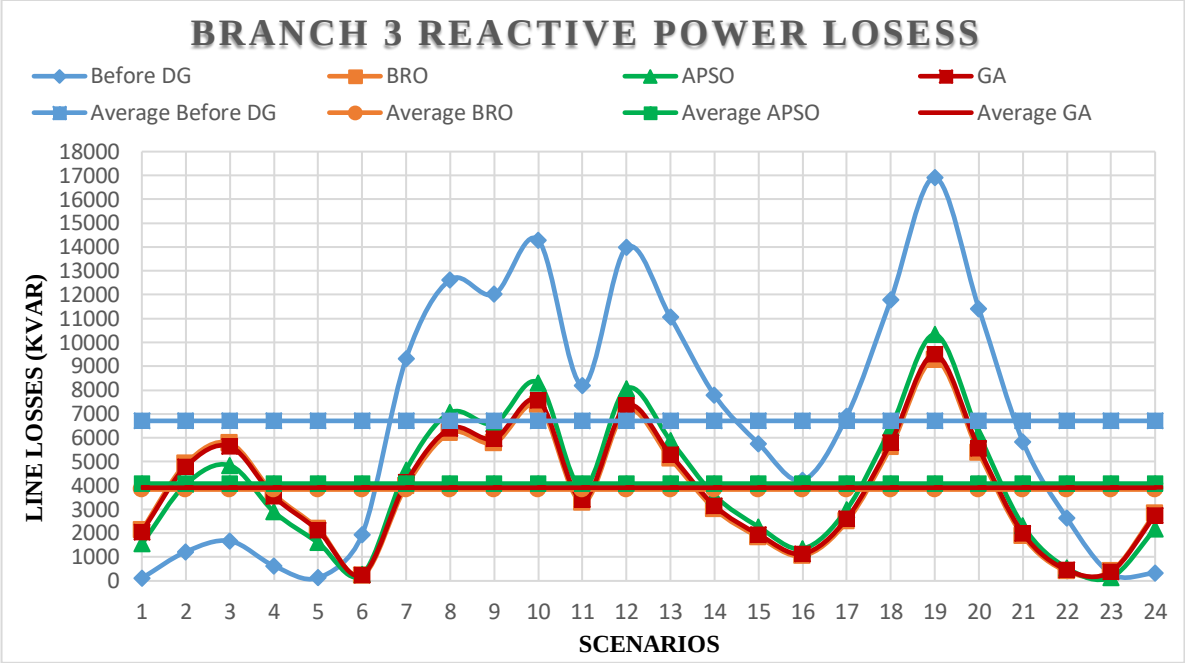

Figure 35: Branch 3 Reactive Power Losses Curve

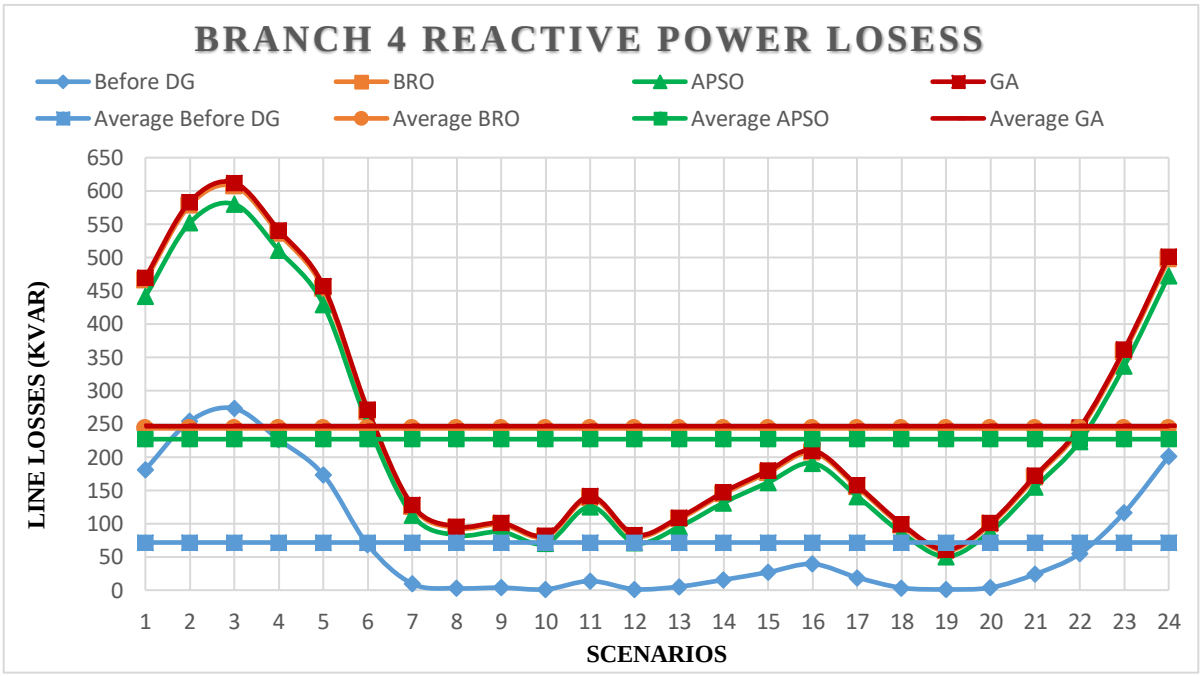

Figure 36: Branch 4 Reactive Power Losses Curve

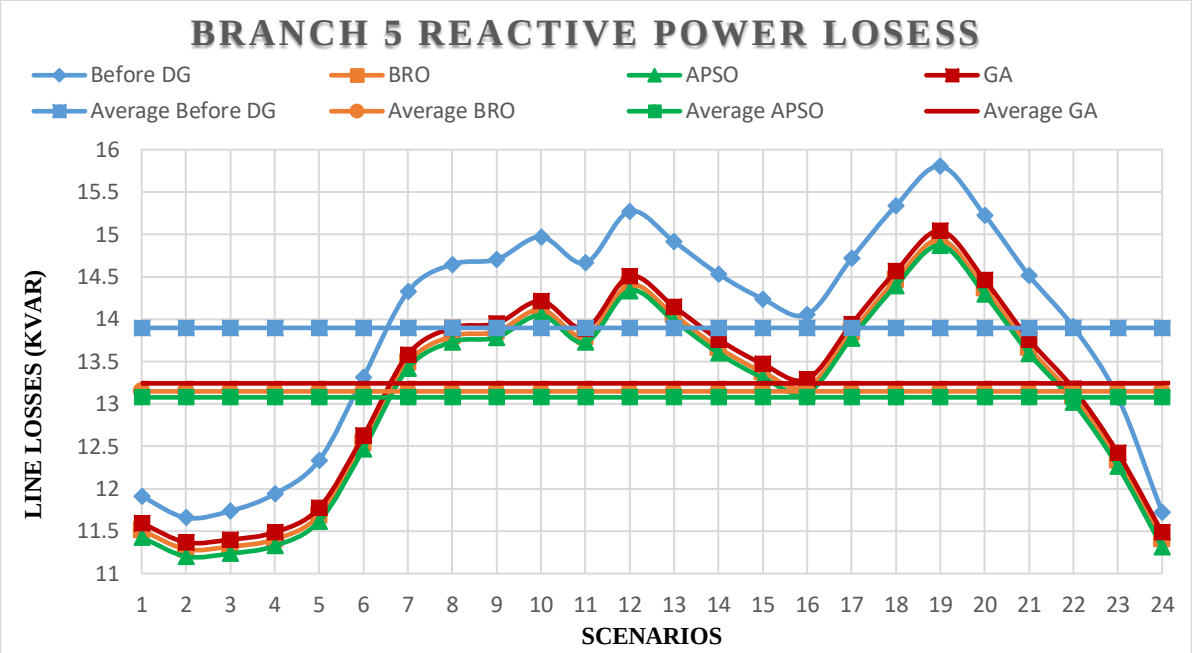

Figure 37: Branch 5 Reactive Power Losses Curve

The actual minimum reactive losses of the system at branch 5 and 6 are 11.65831 and 608.1456 KVAR respectively whereas their peak losses are 15.8043 and 646.9614 KVAR which are maximum reduced up to 14.86768 and 629.9338 KVAR through APSO as compare to other two algorithms. The average reactive losses at branch 7 are 2.396503833, 2.193165, 2.208003 and 2.28575025 KVAR at without DG, BRO, GA and APSO algorithms while having minimum loss deviations at scenario 23.

The reactive loss occurs at branch 8 to branch 11 are shown in Figure 40 to Figure 43. The curves show that peak and average active losses after placement of DGs are higher than losses without DGs as branch 8 to branch 11 are interconnected and having small lengths and larger loads are connected to each bus associated with these branches, in the mean while the DGs are mostly not placed among bus 8 to bus 11 therefore reactive losses increases. The peak reactive losses at branch 12 are reduced up to 5967.061, 1786.354 and 1488.537 KVAR whereas at branch 13 losses are minimized up to 1574.615, 6601.76 and 6092.332 KVAR using BRO, APSO and GA algorithm respectively. The average reactive power losses at 7 pm are 420.7828125, 462.2367607 and 374.545226 KVA at branch 14 using BRO, APSO and GA algorithm while average reactive losses for 24 hours of branch 15 are 3812.275, 1003.268, 964.413 and 1167.314944 KVAR at without DG, BRO, GA and APSO algorithms.

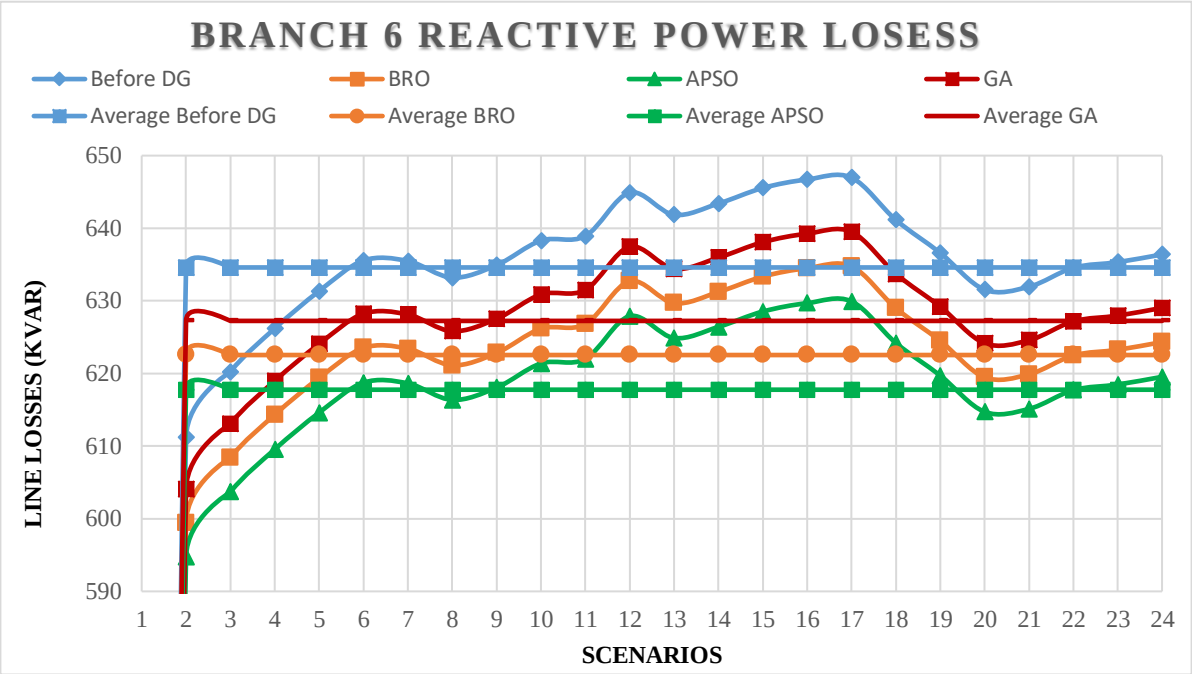

Figure 38: Branch 6 Reactive Power Losses Curve

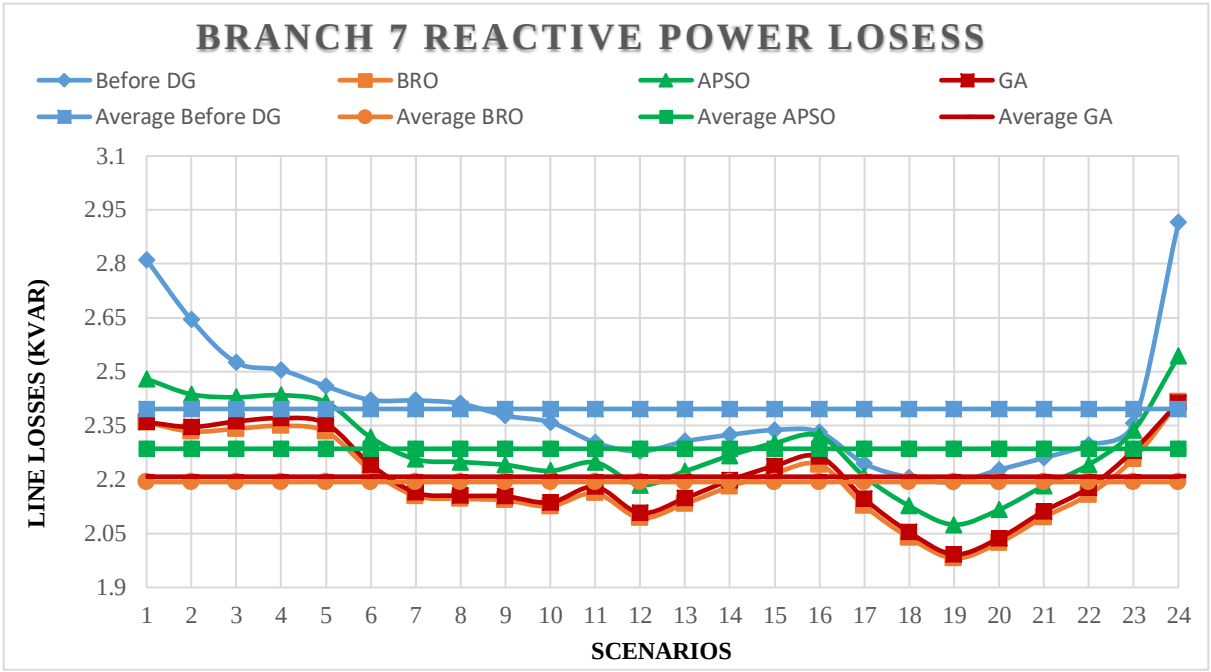

Figure 39: Branch 7 Reactive Power Losses Curve

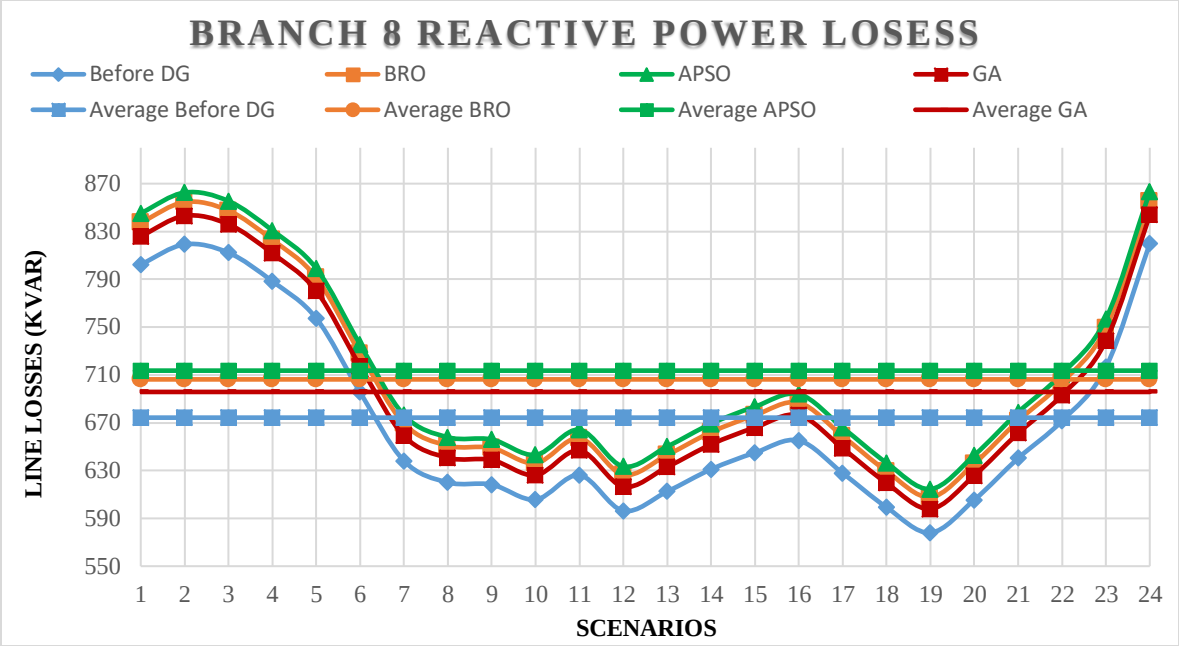

Figure 40: Branch 8 Reactive Power Losses Curve

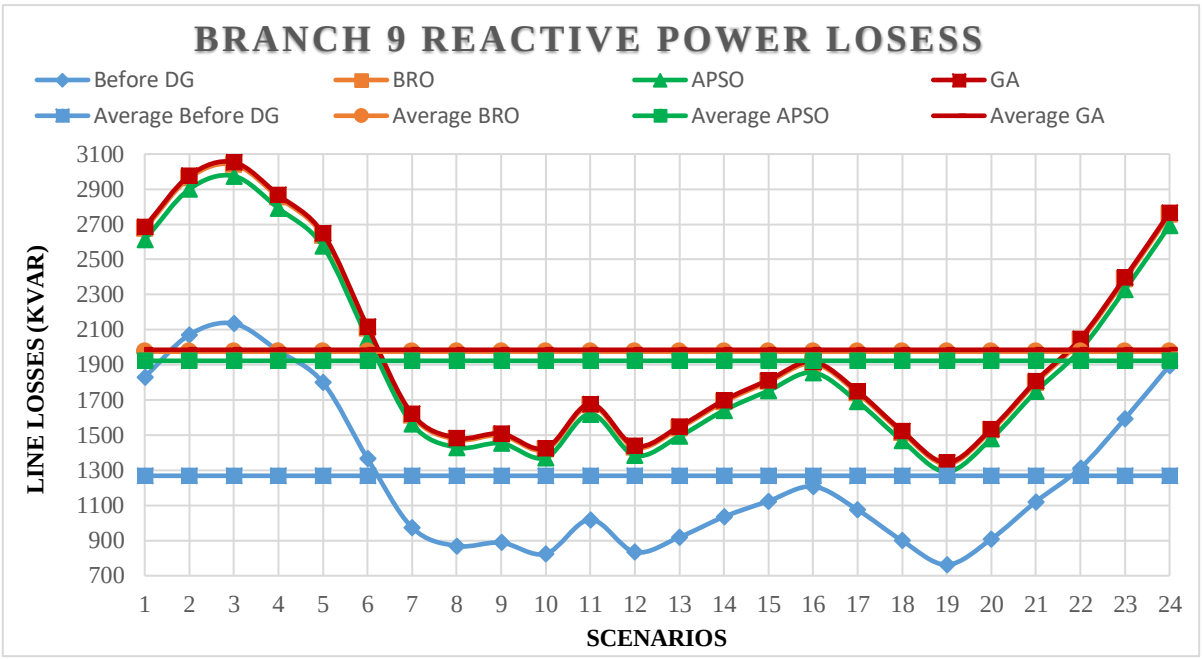

Figure 41: Branch 9 Reactive Power Losses Curve

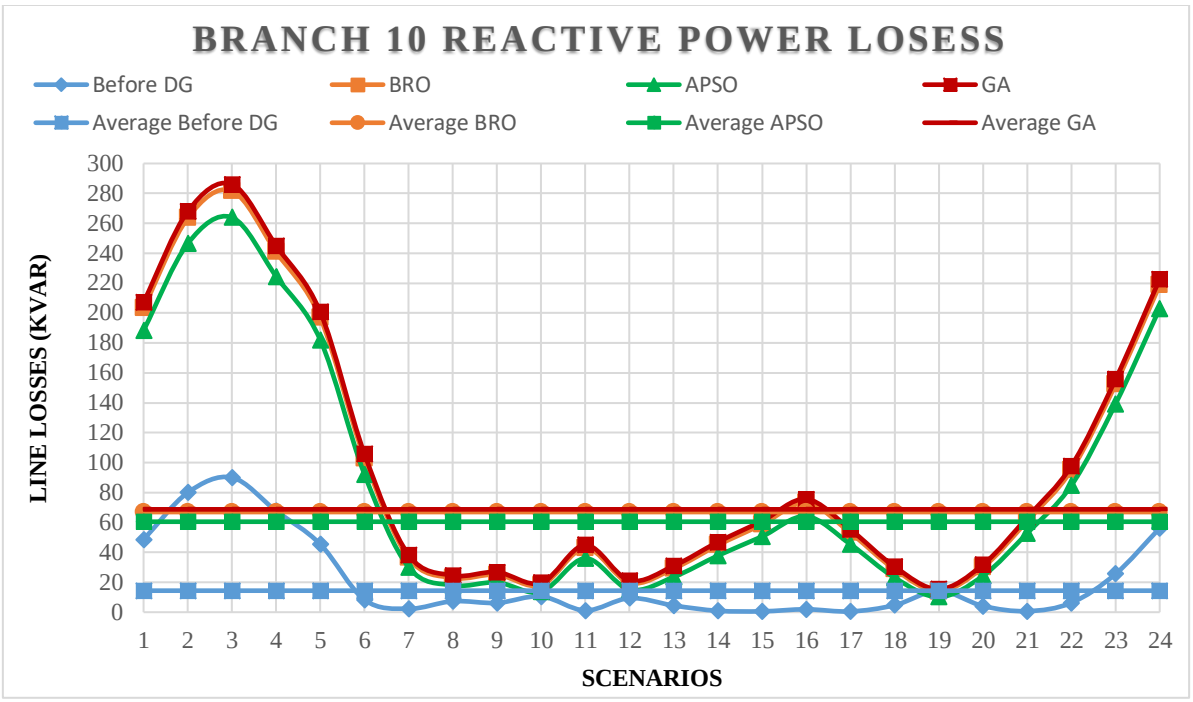

Figure 42: Branch 10 Reactive Power Losses Curve

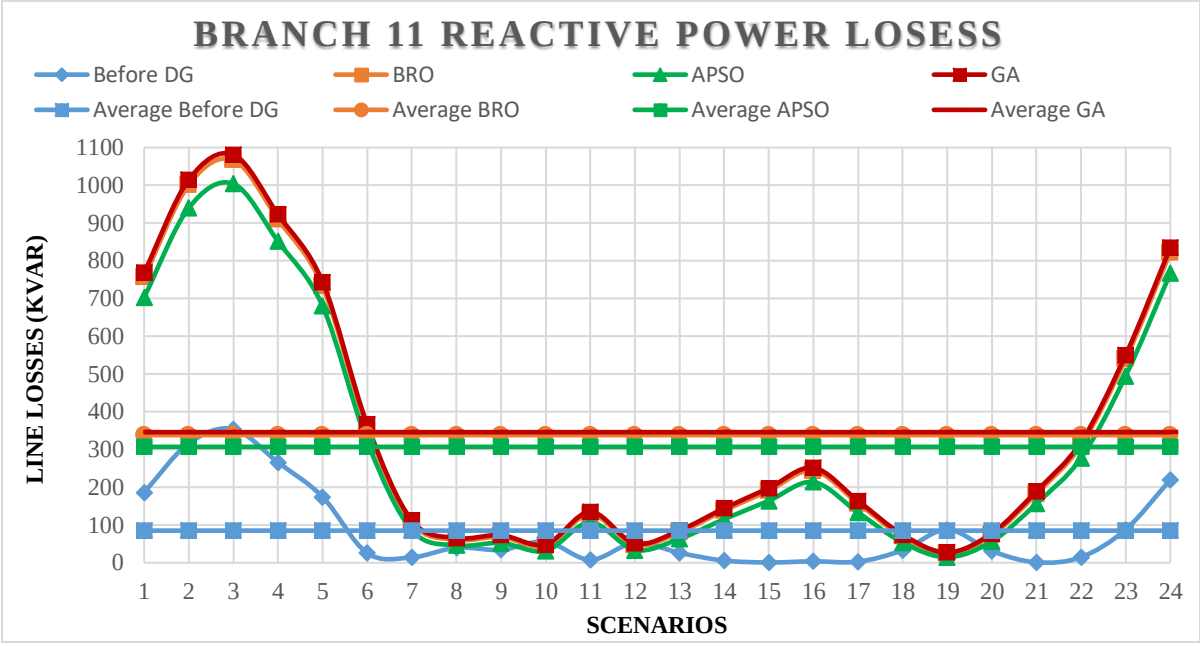

Figure 43: Branch 11 Reactive Power Losses Curve

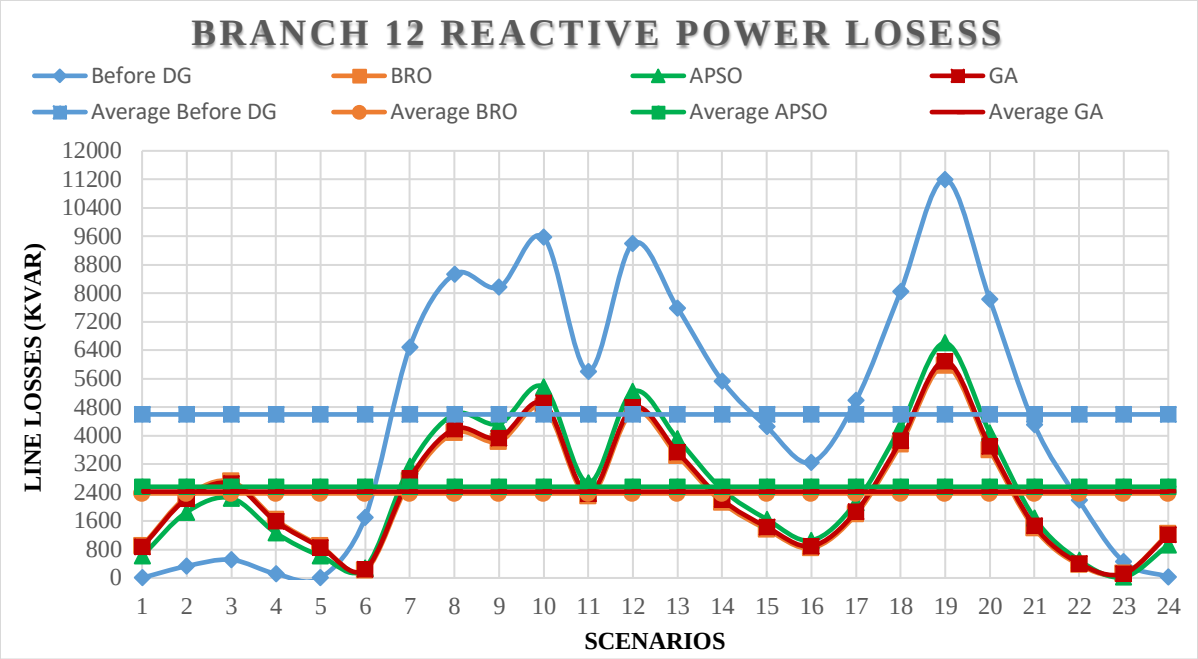

Figure 44: Branch 12 Reactive Power Losses Curve

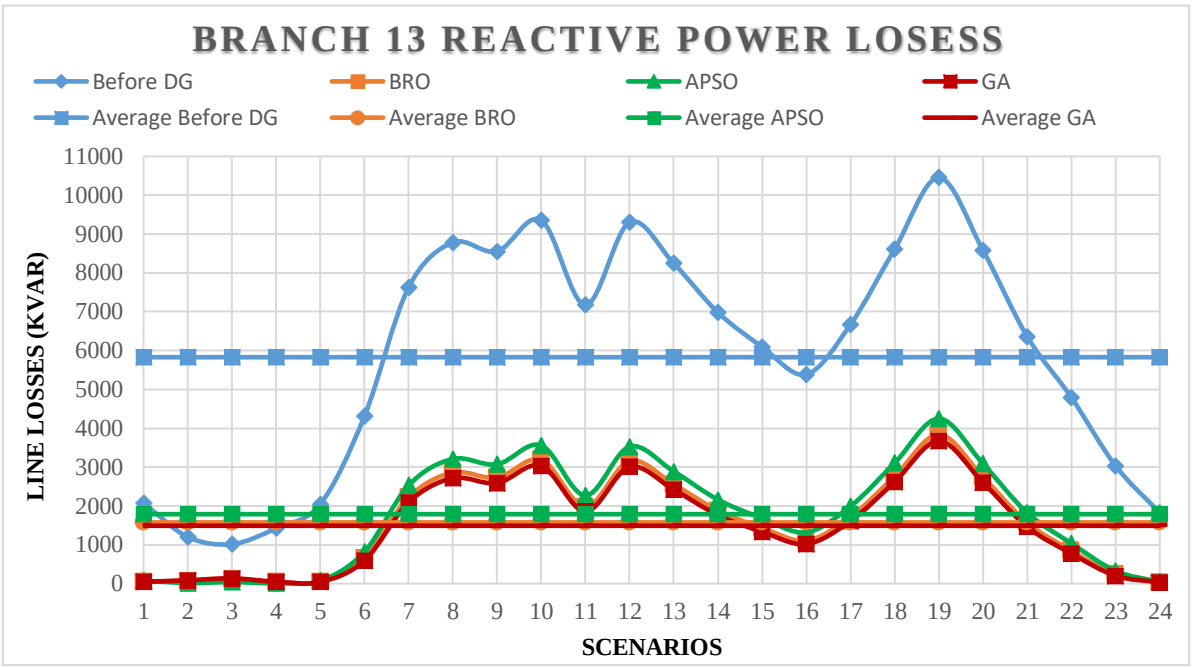

Figure 45: Branch 13 Reactive Power Losses Curve

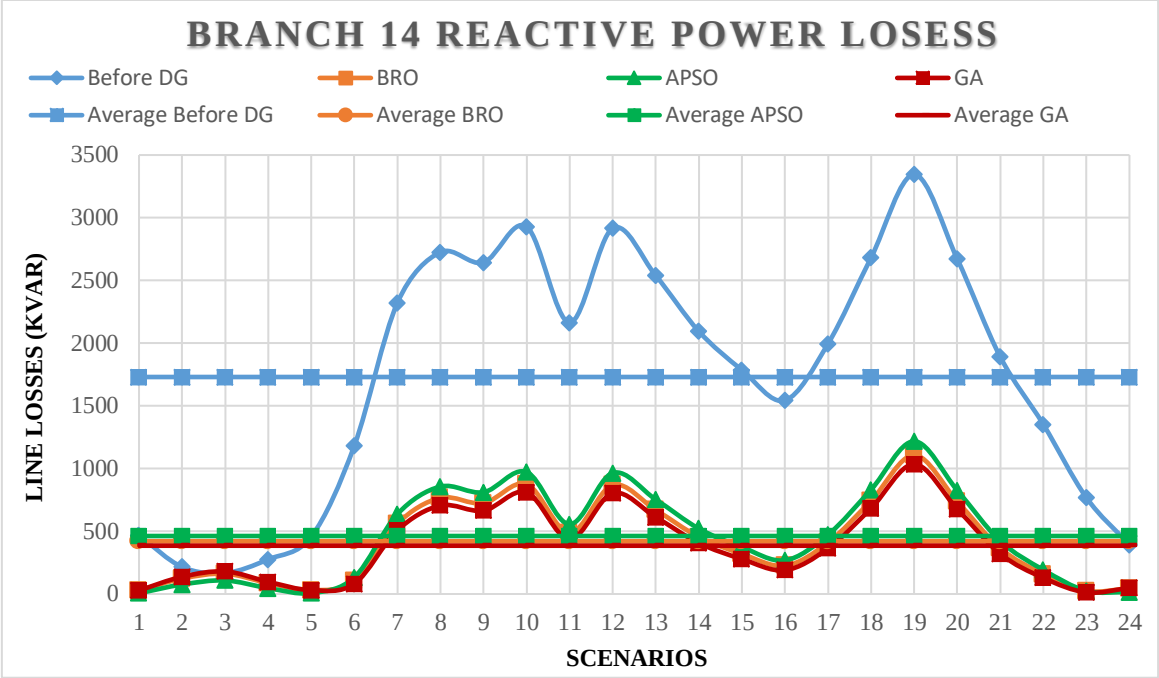

Figure 46: Branch 14 Reactive Power Losses Curve

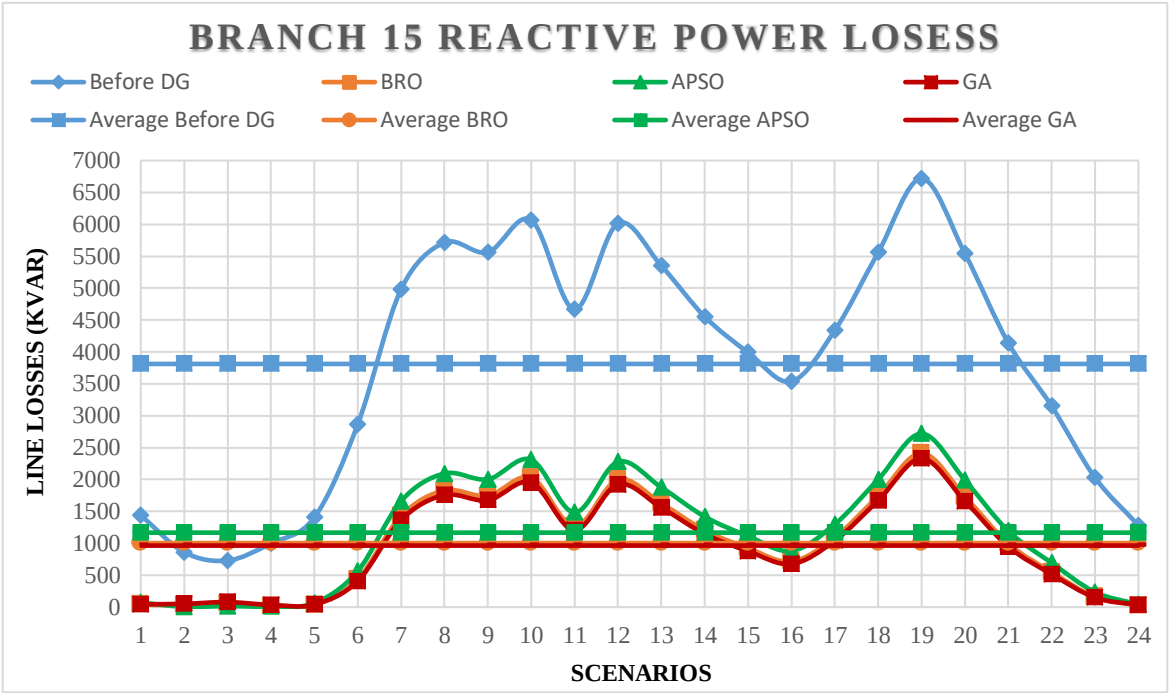

Figure 47: Branch 15 Reactive Power Losses Curve

5.2.6. Bus voltage profiles results

Buses in the system carry some voltages which must be in limits. The whole day voltage pattern of each bus before and after placement of DGs using BRO, APSO and GA algorithms are shown in Figure 48, Figure 49, Figure 50 and Figure 51 respectively. The average minimum voltage before placement of DGs are 0.6654 pu at bus 13 which is improved up to 0.9358, 0.9088 and 0.9293 pu average value after allocation of DGs using GA, APSO and BRO algorithms respectively. The Figure 52 to Figure 63 shows voltage pattern of Bus 3 to Bus 14 voltage at all scenarios respectively whereas average voltage level of each bus are shown in Table 11. The curve of Bus 13 voltage is lowest among all buses as the bus carry maximum load of the system. The minimum voltage among all buses are 0.462182 pu at 19th scenario of bus 13 which is increased up to 0.726061, 0.705585 and 0.732564 pu using BRO, APSO and GA algorithms respectively whereas maximum voltage before allocation of DGs enhanced up to 1.225032, 1.215942 and 1.226702 by DGs settlement in the system using BRO, APSO and GA respectively as shown in **Table 9** . The voltage curves of each bus shows that method used in current thesis improved bus voltages at all scenarios through algorithms used in current study. The voltage profile of buses shows that proposed BRO algorithm have better performance in terms of voltage improvement as compare to bus voltages before placement of DGs.

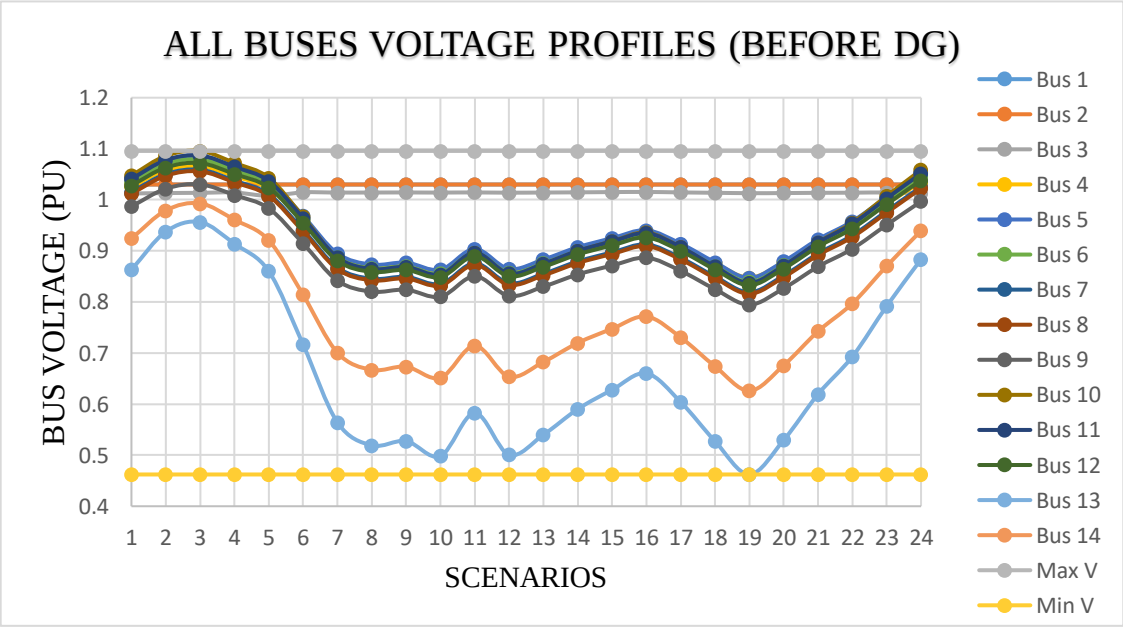

Figure 48: All Buses Voltage Profiles (Before DG)

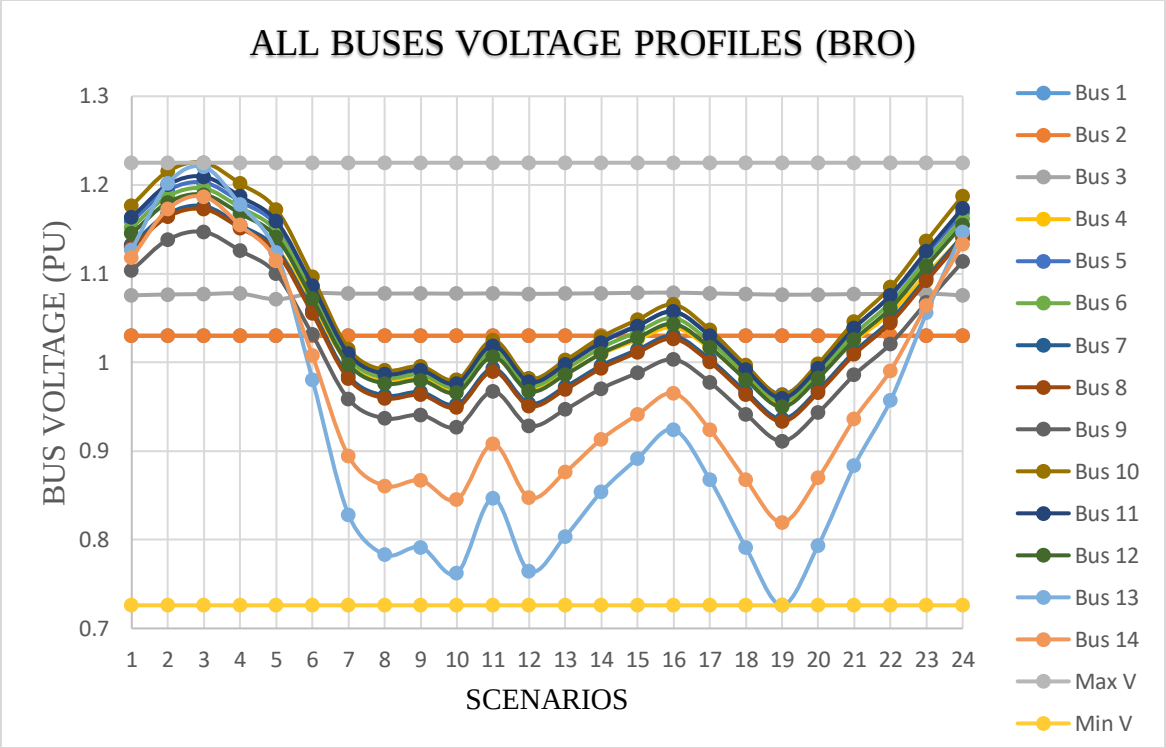

Figure 49: All Buses Voltage Profiles (BRO)

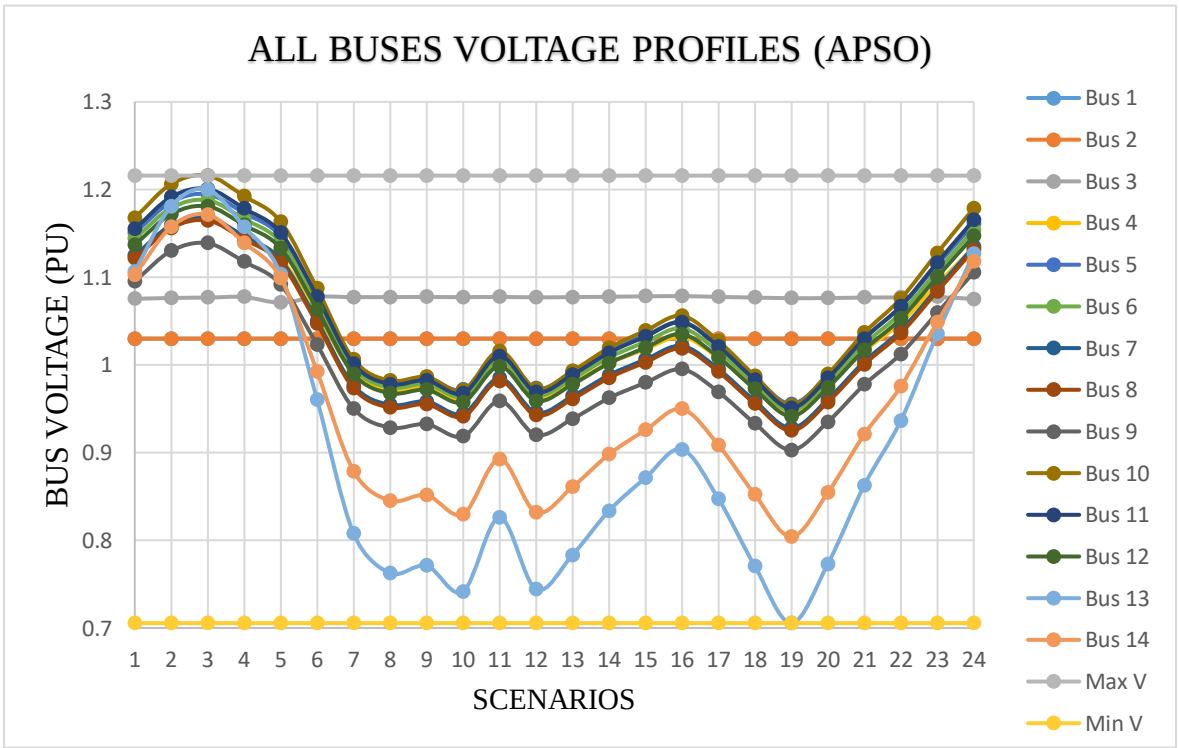

Figure 50: All Buses Voltage Profiles (APSO)

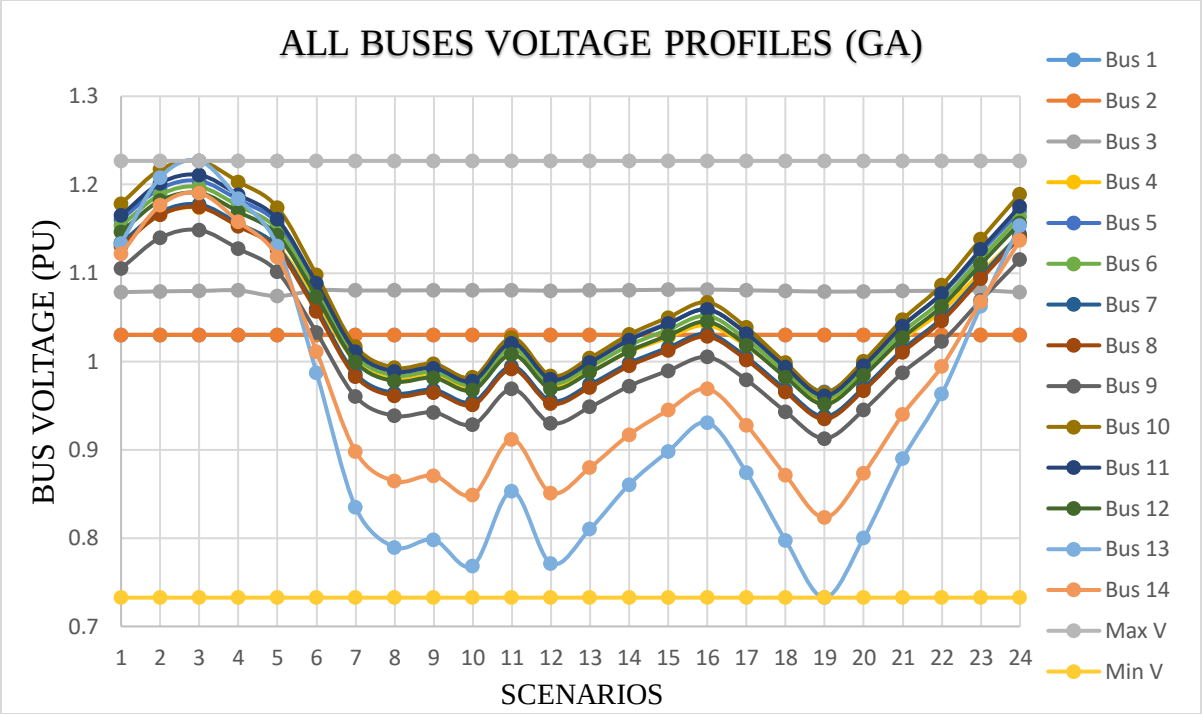

Figure 51: All Buses Voltage Profiles (GA)

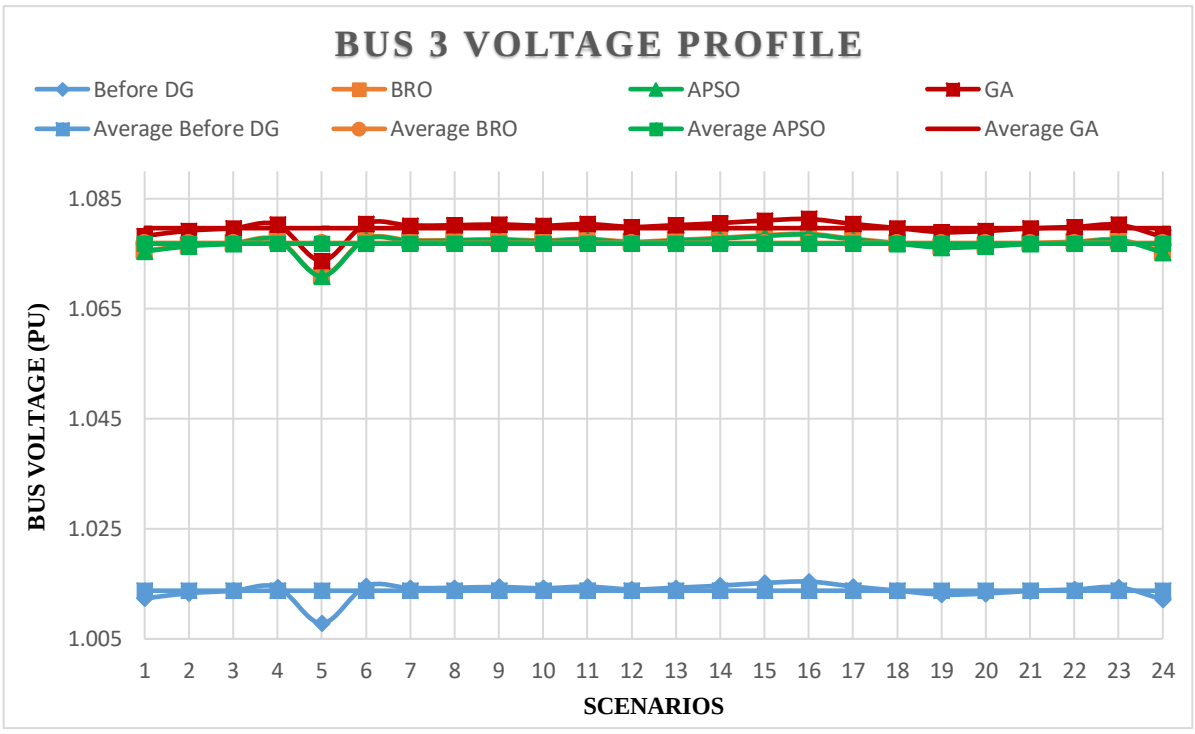

Figure 52: Bus 3 Voltage Profile for all Scenarios

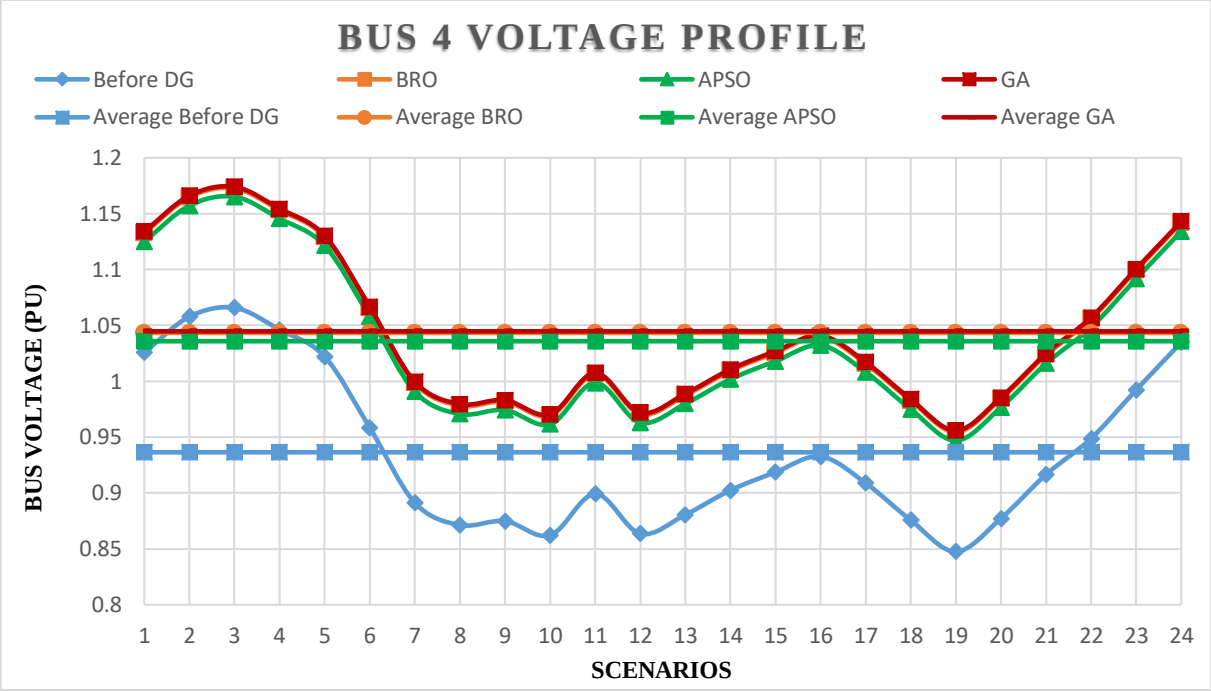

Figure 53: Bus 4 Voltage Profile for all Scenarios

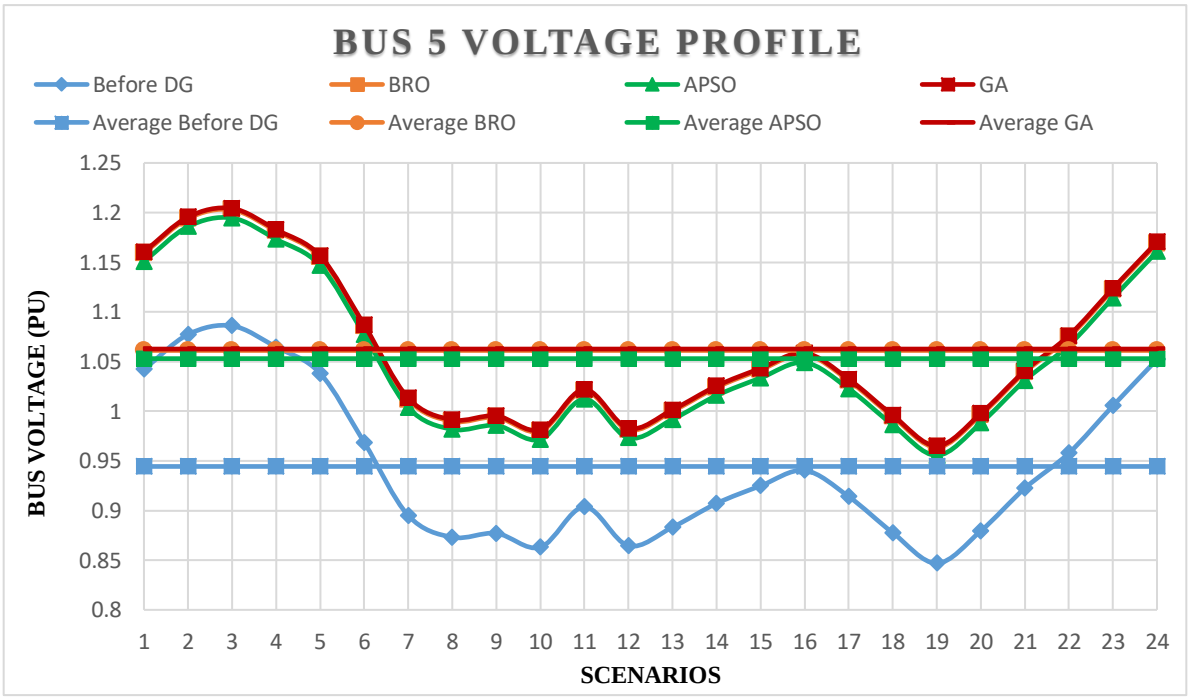

Figure 54: Bus 5 Voltage Profile for all Scenarios

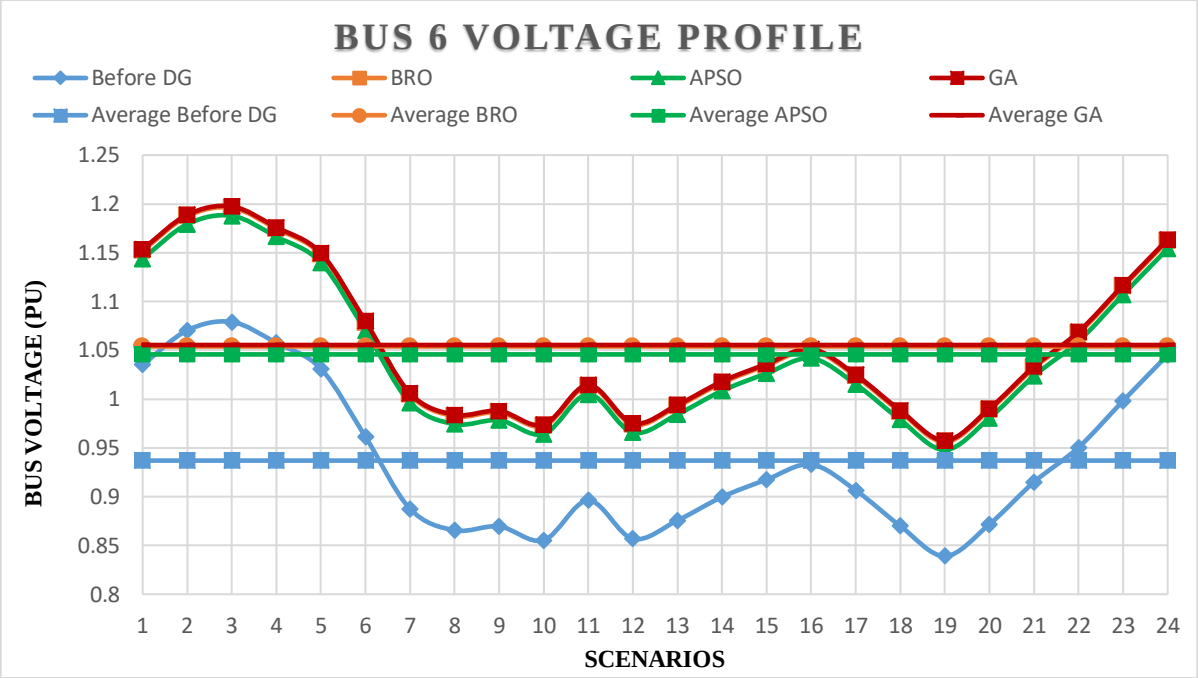

Figure 55: Bus 6 Voltage Profile for all Scenarios

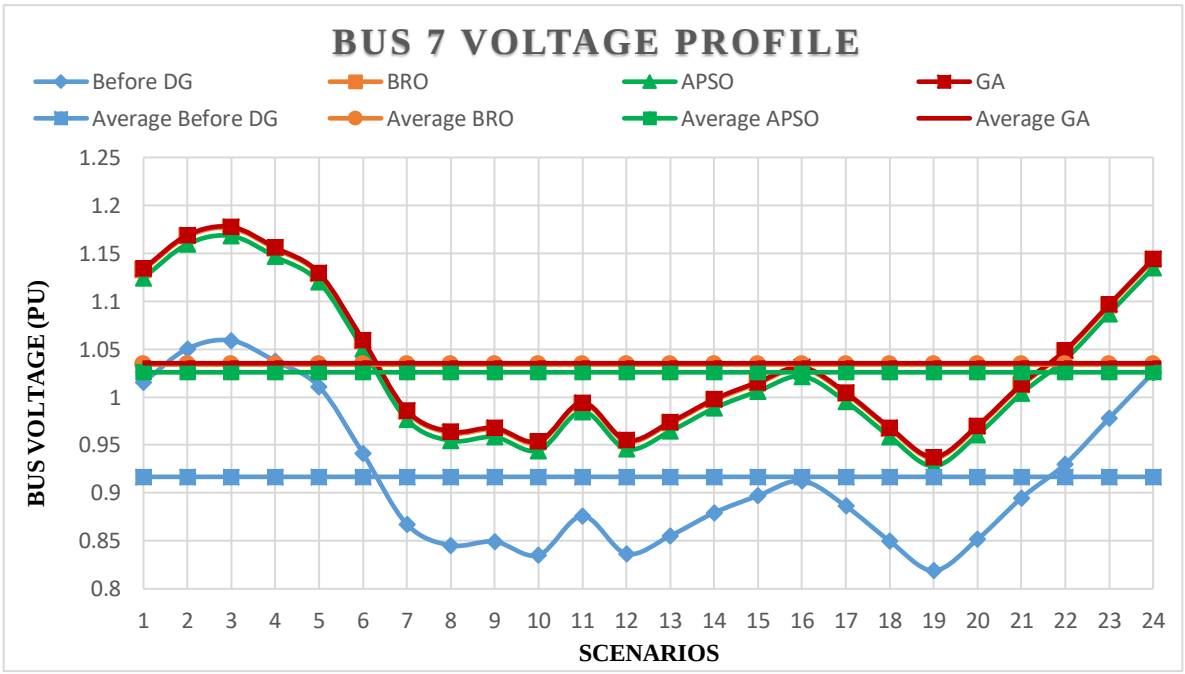

Figure 56: Bus 7 Voltage Profile for all Scenarios

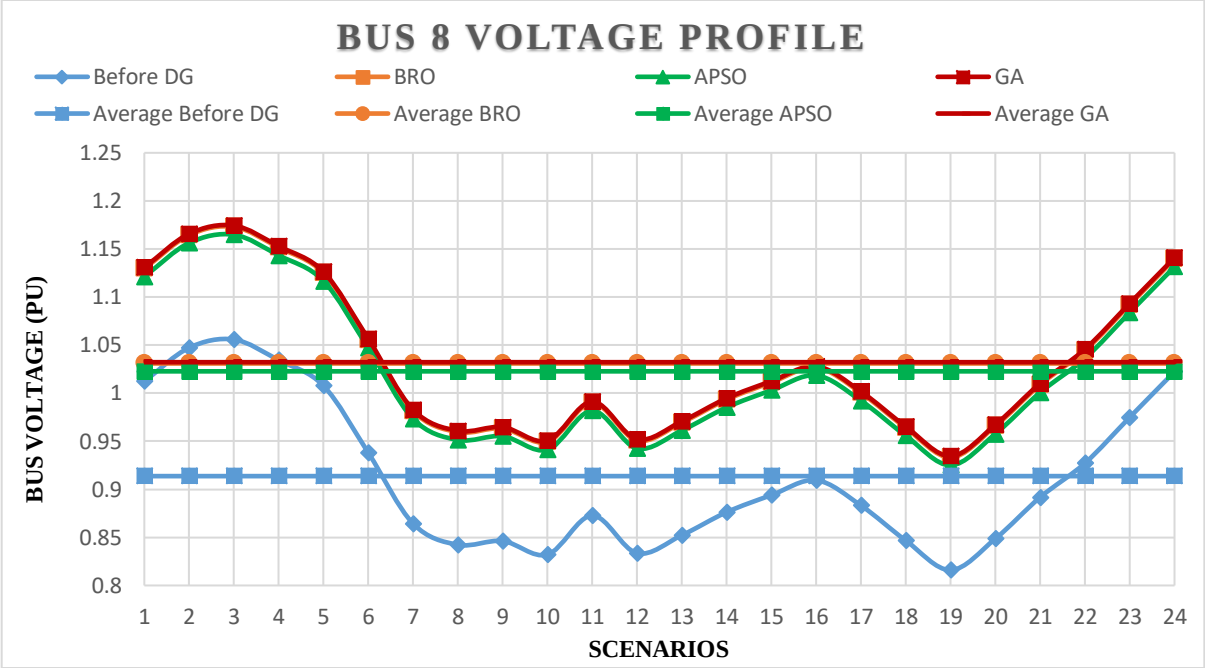

Figure 57: Bus 8 Voltage Profile for all Scenarios

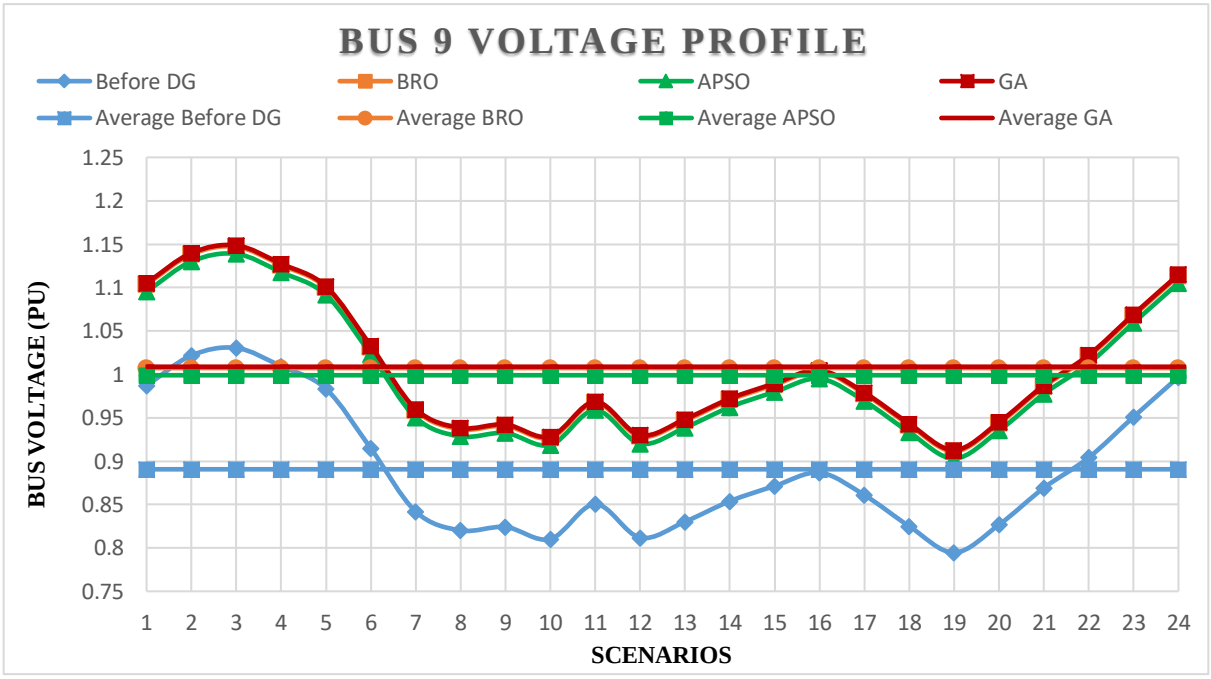

Figure 58: Bus 9 Voltage Profile for all Scenarios

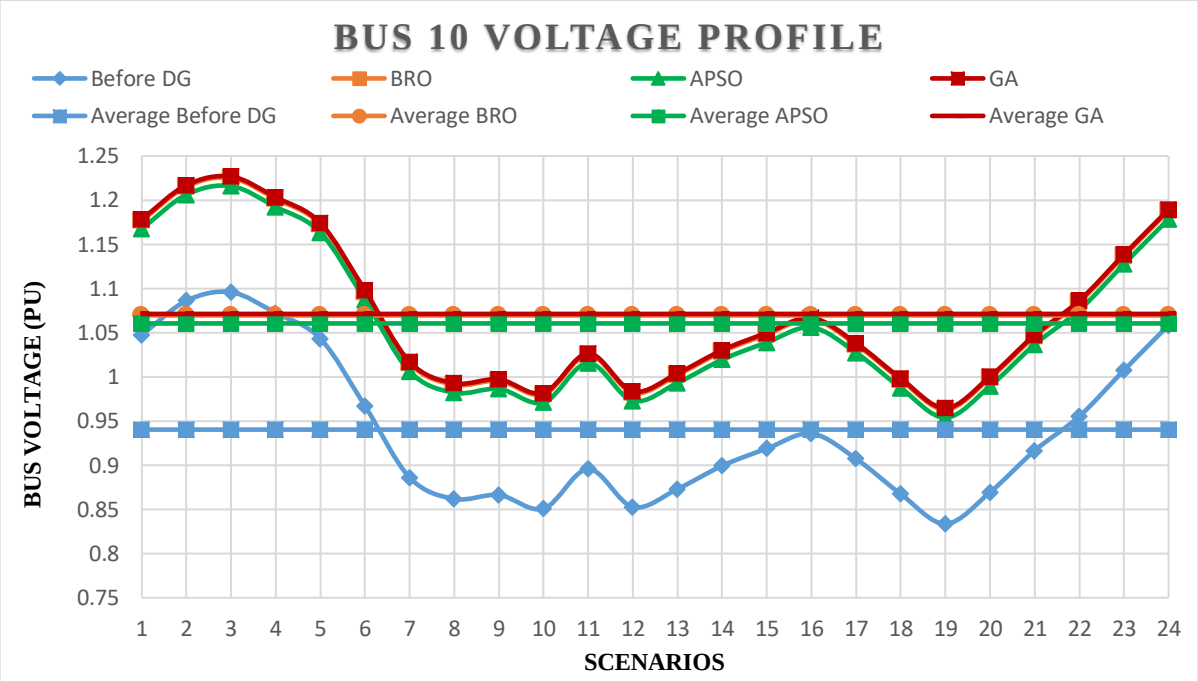

Figure 59: Bus 10 Voltage Profile for all Scenarios

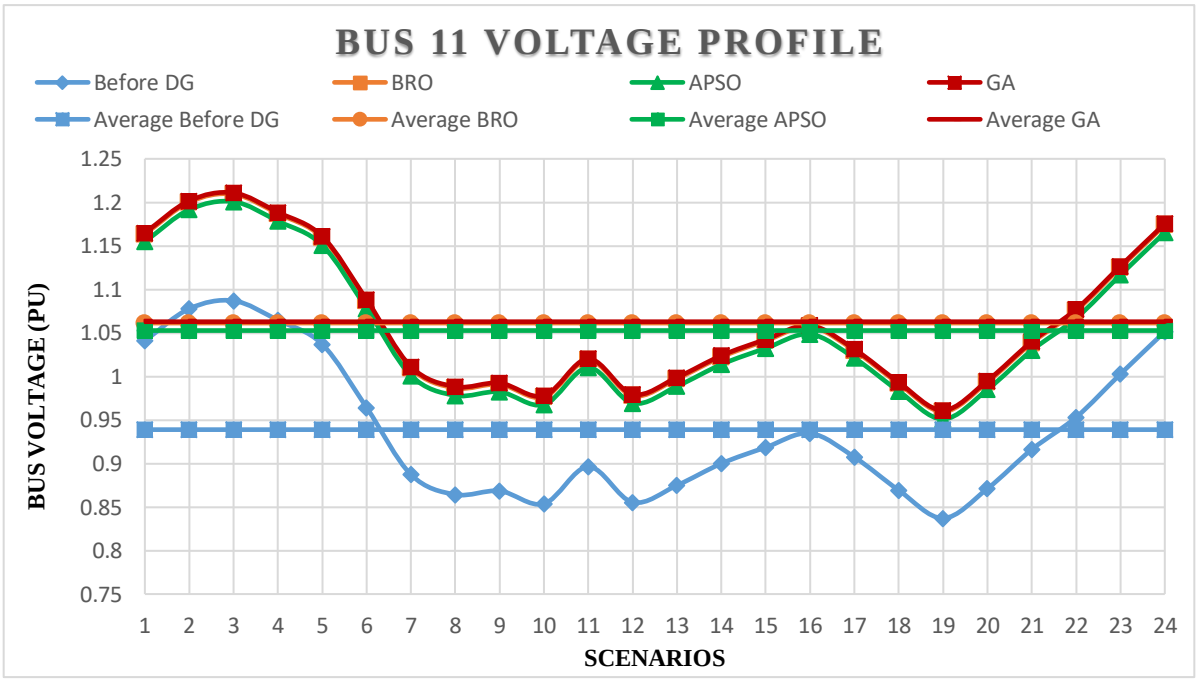

Figure 60: Bus 11 Voltage Profile for all Scenarios

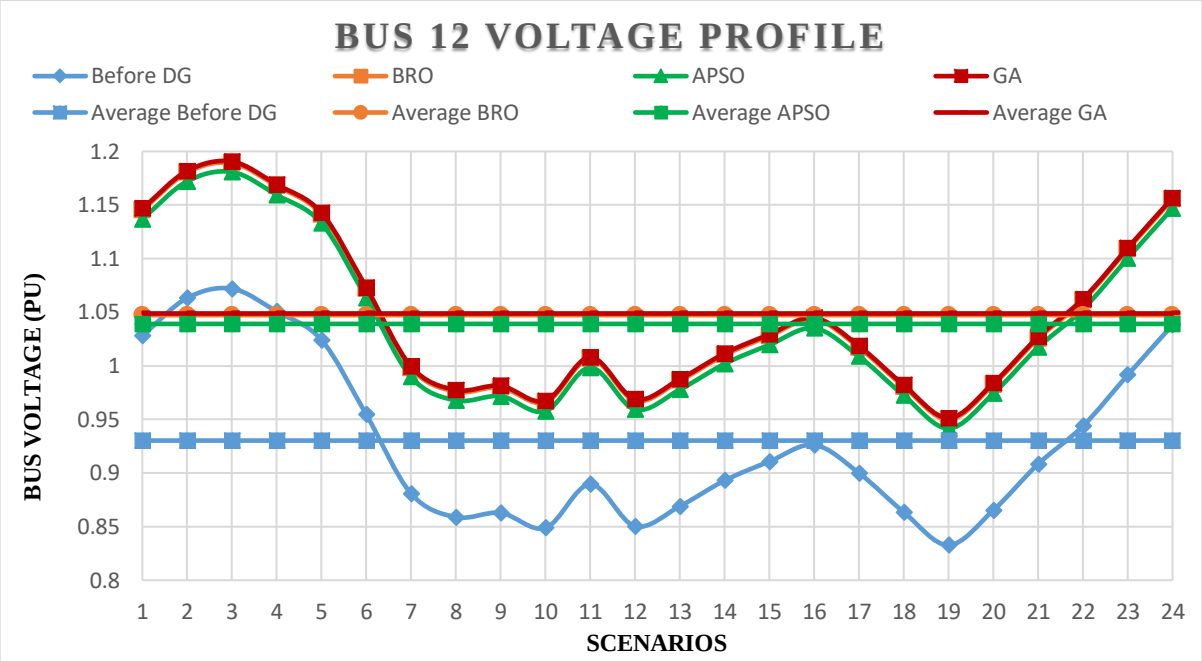

Figure 61: Bus 12 Voltage Profile for all Scenarios

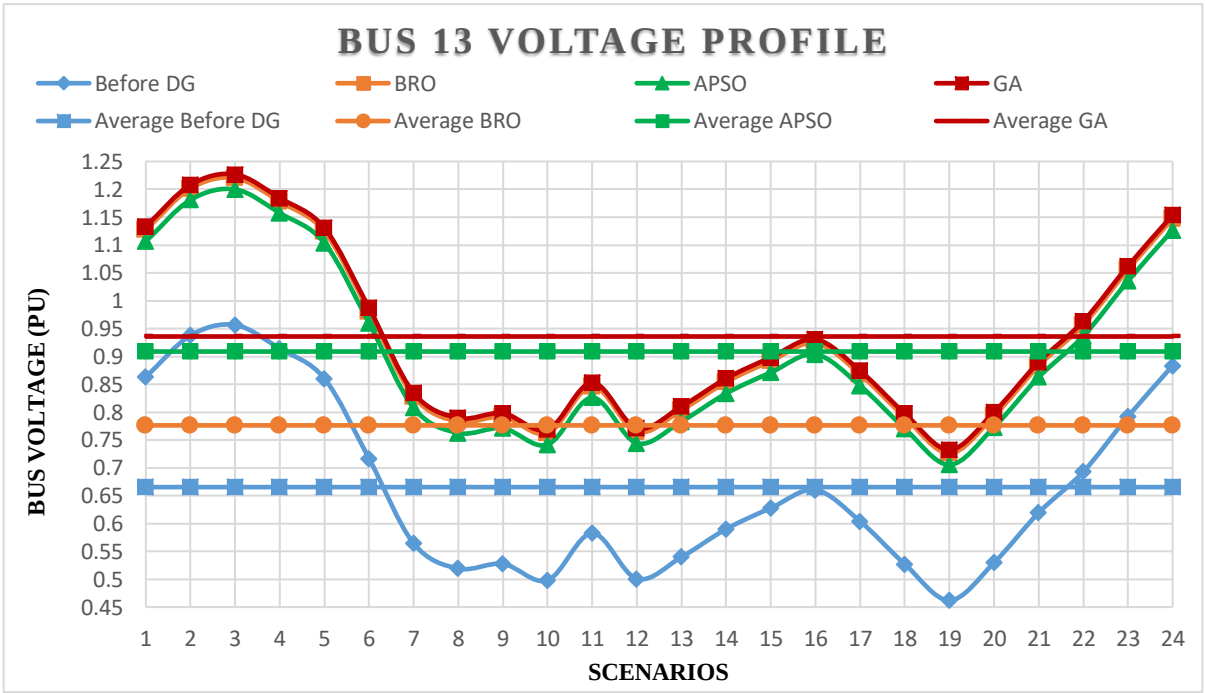

Figure 62: Bus 13 Voltage Profile for all Scenarios

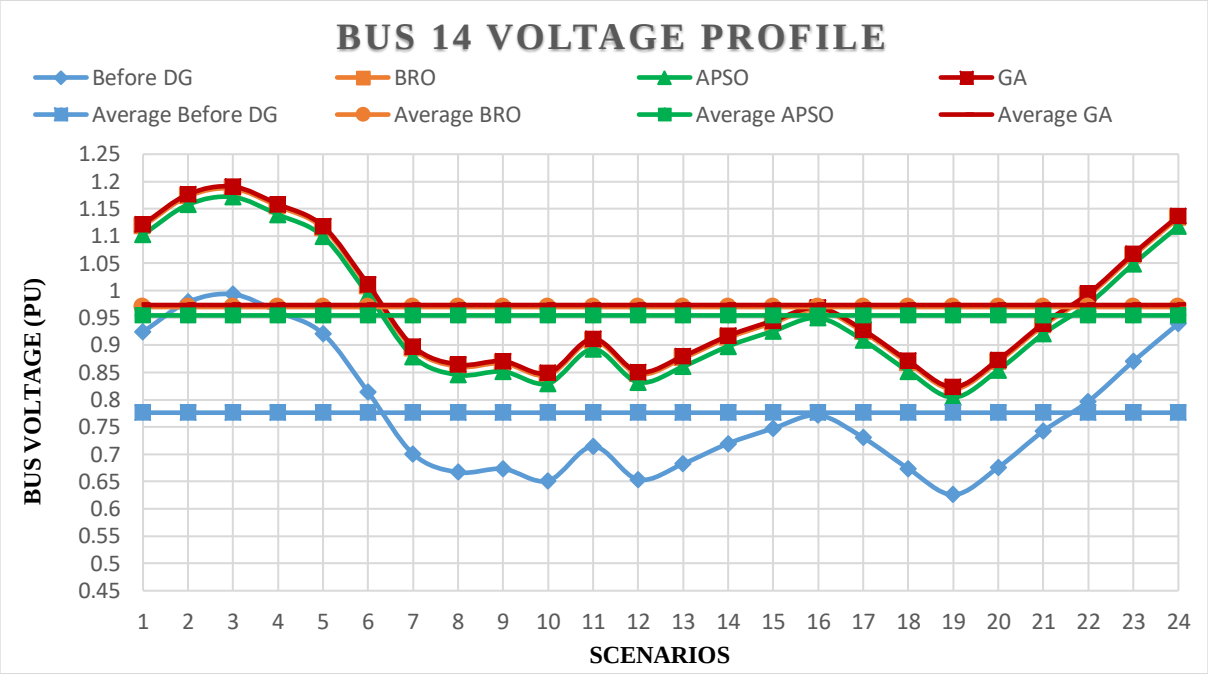

Figure 63: Bus 14 Voltage Profile for all Scenarios

Table 11: Average Bus Voltages

`Average Bus Voltages

Algorithms	*Bus1*	*Bus2*	*Bus3*	*Bus4*	*Bus5*	*Bus6*	*Bus7*	*Bus8*	*Bus9*	*Bus10*	*Bus11*	*Bus12*	*Bus13*	*Bus14*
Before DG	1.0300	1.0300	1.0138	0.9365	0.9444	0.9370	0.9168	0.9137	0.8906	0.9403	0.9389	0.9302	0.6654	0.7762
GA	1.0300	1.0300	1.0797	1.0447	1.0626	1.0554	1.0353	1.0322	1.0088	1.0712	1.0629	1.0488	0.9358	0.9735
APSO	1.0300	1.0300	1.0768	1.0359	1.0530	1.0458	1.0259	1.0227	0.9990	1.0605	1.0527	1.0391	0.9088	0.9545
Proposed BRO	1.0300	1.0300	1.0770	1.0434	1.0612	1.0539	1.0340	1.0309	1.0073	1.0696	1.0613	1.0473	0.9293	0.9699

Table 12: Algorithms parameters

Parameters	*BRO*	*APSO*	*GA*
No. of Iterations	100	100	100
Population Size	100	100	100
Size Range of DGs (kW)	10 ~ 500	10 ~ 500	10 ~ 500

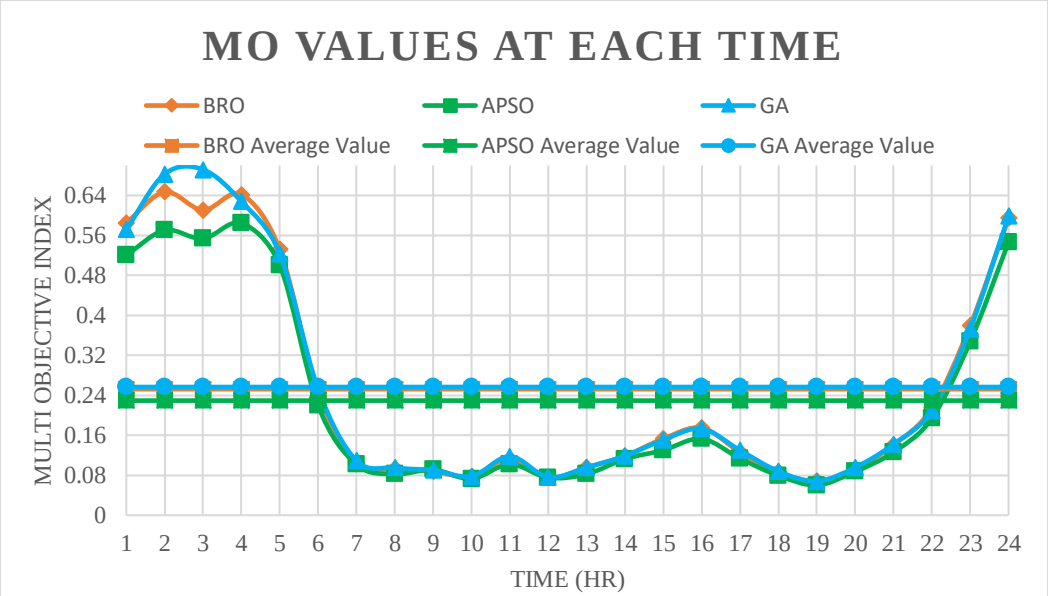

Figure 64: MO Curves

Table 13: Total Fitness values of DGs at each Scenario (APSO)

Total Fitness values (APSO)

DGs	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12	S 13	S 14	S 15	S 16	S 17	S 18	S 19	S 20	S 21	S 22	S 23	S 24
1	9.111	12.956	14.011	10.649	8.574	7.206	15.584	19.860	18.985	22.145	14.218	21.944	18.287	13.726	10.870	9.044	12.683	18.838	25.935	18.978	11.157	7.796	6.439	9.141
2	9.115	12.955	14.006	10.651	8.575	7.206	15.577	19.849	18.994	22.147	14.220	21.941	18.286	13.726	10.873	9.042	12.681	18.837	25.942	18.983	11.157	7.795	6.439	9.144
3	9.122	12.952	14.014	10.649	8.577	7.206	15.575	19.864	18.961	22.141	14.218	21.874	18.280	13.721	10.856	9.038	12.677	18.828	25.940	18.983	11.160	7.796	6.438	9.138
4	9.106	13.018	14.012	10.655	8.566	7.212	15.586	19.870	18.964	22.148	14.239	21.956	18.273	13.718	10.858	9.037	12.688	18.829	25.950	18.985	11.141	7.797	6.439	9.142
5	9.153	13.045	14.014	10.657	8.636	7.221	15.570	19.865	19.018	22.113	14.134	21.887	18.375	13.737	10.860	9.027	12.666	18.850	25.838	19.028	11.151	7.787	6.438	9.177
6	9.088	13.070	13.995	10.545	8.622	7.224	15.620	19.958	18.895	22.142	14.262	22.283	18.549	13.718	10.856	9.052	12.691	18.745	26.077	19.147	11.155	7.797	6.443	9.119
7	9.064	13.457	13.886	10.791	8.553	7.270	15.431	19.974	18.882	22.195	14.339	22.083	18.395	13.637	10.868	8.936	12.634	18.740	26.189	20.116	11.185	7.811	6.441	9.178
8	9.184	13.105	14.262	10.680	8.618	7.350	15.378	19.656	19.162	22.192	14.325	21.329	19.181	13.571	10.753	9.164	12.796	18.723	26.024	19.083	11.290	7.803	**6.432**	9.028
9	9.809	14.226	14.222	11.236	8.916	7.726	15.891	20.299	19.293	21.932	14.550	22.803	18.813	13.722	10.763	9.746	12.336	19.043	25.830	19.388	11.098	7.996	6.459	9.118
10	10.410	13.959	14.072	12.468	9.035	7.956	16.064	20.463	19.388	22.187	14.938	25.993	20.255	14.432	10.840	17.154	12.914	18.790	26.605	19.348	11.344	7.864	6.448	9.185

Table 14: Total Fitness values of DGs at each Scenario (GA)

Total Fitness values (GA)

DGs	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12	S 13	S 14	S 15	S 16	S 17	S 18	S 19	S 20	S 21	S 22	S 23	S 24
1	8.980	13.249	14.583	11.425	9.128	7.162	16.235	19.876	19.339	22.616	14.220	22.390	17.842	14.010	11.314	9.296	12.645	19.168	27.091	18.632	11.489	8.209	6.824	10.026
2	8.996	13.201	14.579	11.422	9.140	7.165	16.217	20.009	19.430	22.403	14.218	22.449	18.081	13.997	11.242	9.245	12.563	19.105	26.986	18.647	11.540	8.215	6.830	9.995
3	9.067	13.125	14.589	11.472	9.174	7.161	16.348	20.178	19.449	22.633	14.278	22.255	17.882	14.119	11.215	9.223	12.602	19.002	27.099	18.835	11.637	8.201	6.838	10.046
4	9.107	13.149	14.629	11.628	9.161	7.198	16.160	20.100	19.440	22.723	14.366	22.500	17.776	14.071	11.291	9.242	12.583	19.058	27.263	18.770	11.484	8.208	6.846	9.988
5	9.072	13.172	14.610	11.545	9.164	7.191	16.055	19.799	19.332	22.622	14.291	22.366	17.770	14.203	11.171	9.273	12.529	18.999	27.080	19.069	11.623	8.185	6.866	9.945
6	9.060	13.071	14.524	11.525	9.213	7.219	16.204	20.151	19.524	22.739	14.334	22.296	17.882	14.118	11.224	9.314	12.666	18.960	27.188	19.031	11.635	8.280	6.875	10.015
7	9.087	13.063	14.628	11.590	9.174	7.194	16.394	20.035	19.533	22.852	14.291	22.499	17.960	14.105	11.247	9.314	12.598	19.083	27.071	18.868	11.637	8.297	6.889	9.985
8	9.064	13.053	14.573	11.602	9.223	7.240	16.367	20.079	19.578	22.539	14.389	22.287	17.892	14.094	11.391	9.234	12.572	19.070	27.381	18.837	11.701	8.231	6.895	10.003
9	9.142	13.119	14.580	11.611	9.218	7.244	16.317	20.171	19.579	22.792	14.344	22.399	17.865	14.175	11.290	9.226	12.683	19.197	27.028	18.781	11.644	8.356	6.905	9.992
10	9.134	13.032	14.755	11.544	9.234	7.252	16.351	20.132	19.426	22.728	14.409	22.443	17.904	14.160	11.219	9.323	12.753	19.230	27.076	18.733	11.680	8.327	6.914	10.036

Table 15: Total Fitness values of DGs at each Scenario (BRO)

Total Fitness values (BRO)

DGs	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12	S 13	S 14	S 15	S 16	S 17	S 18	S 19	S 20	S 21	S 22	S 23	S 24
1	9.154	12.932	15.879	12.233	9.696	7.232	16.215	20.223	19.454	22.816	14.097	23.001	18.586	13.672	10.836	9.040	13.039	19.390	27.272	19.260	11.970	7.735	6.947	9.890
2	9.025	12.970	15.979	12.362	9.686	7.255	17.048	20.080	19.415	22.791	13.932	23.216	18.795	14.055	11.156	9.501	13.483	19.614	28.062	19.574	12.489	7.761	7.059	10.258
3	9.220	13.080	16.484	12.280	9.515	7.243	16.489	20.459	20.337	23.767	14.208	22.933	18.896	14.262	11.100	9.391	13.617	20.176	27.414	20.288	12.515	7.936	7.210	9.944
4	9.191	13.609	16.680	12.233	9.899	7.362	16.718	20.688	20.176	22.729	14.787	23.323	19.179	14.691	11.442	9.759	13.615	19.310	27.841	20.562	12.679	7.887	7.363	9.842
5	9.279	13.010	16.627	12.254	9.987	7.540	17.439	20.115	20.635	23.745	15.538	23.967	19.183	15.628	11.254	10.240	13.790	19.979	26.738	21.022	13.006	8.139	7.366	10.112
6	9.573	12.952	16.440	12.349	9.781	7.985	16.789	19.808	20.771	22.761	15.595	23.671	18.927	14.642	10.883	9.938	14.004	21.113	27.273	20.245	13.297	8.195	7.504	10.124
7	9.407	12.907	16.258	12.250	10.039	8.056	17.553	21.206	20.690	23.869	16.604	23.767	18.950	15.320	11.730	9.612	14.343	19.684	27.903	21.502	13.670	8.291	7.580	10.123
8	9.781	13.035	16.707	12.544	10.258	8.342	17.028	21.353	21.974	22.331	16.139	23.765	19.325	16.406	12.228	10.057	14.563	19.898	27.775	21.408	13.112	8.949	7.696	10.513
9	9.806	13.017	16.839	12.808	10.280	8.497	16.649	22.190	23.147	23.453	16.815	24.681	20.069	17.037	12.025	10.459	14.590	20.314	26.195	21.354	14.682	9.009	7.764	10.179
10	10.033	11.986	17.244	13.077	10.246	8.541	19.392	22.019	22.205	23.385	17.386	24.185	19.975	16.382	12.003	10.919	15.373	20.623	27.331	20.330	14.374	9.114	7.849	10.455

Chapter 6

Conclusions and Future Work

CHAPTER 6. CONCLUSIONS AND FUTURE WORK

6.1. Conclusion

System stability is improved in this thesis by minimizing active and reactive losses and improvement in bus voltage profiles by achieving through multi-objective-index in the presence of variable load and generation during 24 hours. The all objectives are achieved by allocation of suitable size of DGs in "CIGRE mv bench mark model" for a whole day by making 24 scenarios while each represents single hour of the day. Suitable size of three DGs for each scenario are selected on the basis of minimum MO value while the robust solution i.e. optimum size of three DGs for a whole day are placed among DGs selected during each scenarios by selecting the minimum total fitness value obtained by each set of DGs in all scenarios. The maximum minimized loses along branches are achieved by using BRO algorithm whereas maximum minimized total reactive system losses under all scenarios are also achieved by this algorithm. The method is implemented on 14 bus "CIGRE mv bench mark model" using the min-max regret idea. The results are taken with BRO, GA and APSO algorithms.

6.2. Future Work

In future work, different types of buses should place in system to minimize system losses by increase system stability whereas the enhancement of losses in some branches arises instead of minimizing which will also be analysed in future. The robust solution that is selection of DG used in current study is based on the idea of min-max regret criteria which will be modified relevant to latest versions of min-max regret criteria to find best DGs allocations.

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APPENDIX

Table 16: MO values of all DGs at each scenario (BRO)

MO values(BRO)																								
DGs	*S 1*	*S 2*	*S 3*	*S 4*	*S 5*	*S 6*	*S 7*	*S 8*	*S 9*	*S 10*	*S 11*	*S 12*	*S 13*	*S 14*	*S 15*	*S 16*	*S 17*	*S 18*	*S 19*	*S 20*	*S 21*	*S 22*	*S 23*	*S 24*
1	0.578	0.740	0.787	0.686	0.559	0.534	0.624	0.651	0.646	0.662	0.614	0.660	0.639	0.610	0.588	0.569	0.600	0.645	0.679	0.642	0.588	0.543	0.515	0.615
2	0.582	0.756	0.806	0.699	0.563	0.525	0.613	0.640	0.635	0.652	0.602	0.650	0.628	0.598	0.576	0.558	0.589	0.633	0.668	0.631	0.576	0.534	0.510	0.622
3	0.587	0.752	0.798	0.697	0.568	0.537	0.624	0.651	0.646	0.662	0.614	0.660	0.639	0.610	0.588	0.569	0.601	0.644	0.679	0.642	0.589	0.546	0.521	0.625
4	0.599	0.775	0.824	0.717	0.579	0.532	0.616	0.642	0.638	0.654	0.606	0.652	0.631	0.602	0.581	0.563	0.592	0.636	0.670	0.633	0.581	0.540	0.523	0.640
5	0.609	0.787	0.836	0.728	0.590	0.534	0.617	0.643	0.639	0.654	0.607	0.652	0.631	0.603	0.582	0.564	0.594	0.637	0.671	0.634	0.582	0.542	0.528	0.651
6	0.620	0.787	0.833	0.734	0.599	0.553	0.631	0.656	0.651	0.667	0.621	0.665	0.644	0.617	0.598	0.582	0.609	0.650	0.682	0.647	0.597	0.560	0.547	0.658
7	0.632	0.823	0.874	0.762	0.611	0.538	0.612	0.638	0.633	0.649	0.602	0.647	0.626	0.599	0.579	0.563	0.590	0.631	0.665	0.629	0.579	0.543	0.541	0.677
8	0.644	0.819	0.867	0.765	0.623	0.562	0.631	0.655	0.651	0.666	0.622	0.664	0.644	0.618	0.600	0.585	0.610	0.649	0.681	0.647	0.599	0.566	0.563	0.685
9	0.669	0.863	0.914	0.801	0.649	0.551	0.620	0.644	0.640	0.655	0.611	0.653	0.633	0.607	0.589	0.573	0.599	0.638	0.671	0.636	0.589	0.556	0.564	0.717
10	0.698	0.901	0.952	0.840	0.675	0.563	0.619	0.642	0.638	0.652	0.611	0.650	0.632	0.608	0.592	0.580	0.600	0.636	0.667	0.634	0.591	0.564	0.584	0.748
11	0.646	0.617	0.618	0.633	0.627	0.780	0.840	0.854	0.852	0.860	0.835	0.858	0.848	0.833	0.822	0.810	0.827	0.850	0.867	0.848	0.819	0.788	0.726	0.630
12	0.652	0.624	0.625	0.640	0.633	0.781	0.840	0.854	0.852	0.860	0.835	0.858	0.848	0.833	0.822	0.811	0.827	0.850	0.867	0.848	0.819	0.789	0.729	0.637
13	0.658	0.629	0.629	0.646	0.638	0.788	0.844	0.857	0.855	0.863	0.839	0.862	0.851	0.837	0.827	0.816	0.832	0.853	0.870	0.851	0.824	0.795	0.737	0.642
14	0.681	0.634	0.630	0.659	0.661	0.818	0.868	0.879	0.878	0.884	0.864	0.883	0.874	0.862	0.854	0.844	0.857	0.875	0.890	0.874	0.850	0.825	0.768	0.660
15	0.660	0.636	0.638	0.652	0.640	0.783	0.839	0.852	0.850	0.858	0.834	0.856	0.846	0.832	0.821	0.810	0.826	0.848	0.865	0.846	0.818	0.789	0.734	0.646
16	0.664	0.645	0.648	0.659	0.643	0.777	0.833	0.847	0.845	0.853	0.828	0.851	0.841	0.826	0.816	0.805	0.821	0.843	0.860	0.841	0.813	0.784	0.731	0.651
17	0.668	0.656	0.659	0.667	0.647	0.773	0.829	0.843	0.840	0.849	0.824	0.847	0.836	0.822	0.811	0.800	0.816	0.839	0.856	0.837	0.808	0.780	0.729	0.657
18	0.678	0.666	0.669	0.678	0.657	0.780	0.832	0.846	0.843	0.851	0.827	0.850	0.840	0.826	0.815	0.805	0.820	0.841	0.858	0.840	0.812	0.786	0.738	0.668
19	0.695	0.694	0.700	0.703	0.673	0.775	0.824	0.837	0.835	0.843	0.819	0.841	0.831	0.817	0.807	0.798	0.812	0.833	0.850	0.831	0.804	0.779	0.741	0.688
20	0.672	0.720	0.738	0.709	0.650	0.708	0.766	0.783	0.780	0.791	0.760	0.789	0.776	0.758	0.744	0.732	0.751	0.779	0.801	0.777	0.743	0.713	0.682	0.678
21	0.807	0.698	0.677	0.750	0.788	0.945	0.960	0.964	0.963	0.966	0.959	0.965	0.962	0.959	0.958	0.957	0.957	0.962	0.967	0.961	0.954	0.945	0.909	0.773
22	0.818	0.711	0.690	0.762	0.798	0.949	0.962	0.965	0.964	0.966	0.961	0.966	0.963	0.961	0.960	0.959	0.959	0.963	0.967	0.962	0.956	0.949	0.916	0.785
23	0.851	0.738	0.714	0.793	0.830	0.974	0.978	0.979	0.979	0.980	0.978	0.979	0.979	0.978	0.980	0.980	0.977	0.977	0.980	0.976	0.975	0.972	0.948	0.817

24	0.863	0.747	0.722	0.805	0.842	0.985	0.985	0.985	0.985	0.986	0.985	0.985	0.985	0.986	0.988	0.990	0.985	0.984	0.985	0.983	0.983	0.982	0.961	0.829
25	0.868	0.760	0.736	0.815	0.846	0.980	0.979	0.980	0.980	0.980	0.979	0.979	0.979	0.980	0.982	0.984	0.979	0.978	0.980	0.977	0.977	0.977	0.959	0.836
26	0.870	0.774	0.754	0.826	0.848	0.968	0.965	0.967	0.967	0.967	0.965	0.967	0.966	0.966	0.968	0.970	0.965	0.965	0.967	0.964	0.963	0.964	0.952	0.840
27	0.874	0.795	0.778	0.840	0.852	0.953	0.951	0.953	0.952	0.954	0.950	0.953	0.952	0.951	0.952	0.954	0.950	0.951	0.954	0.950	0.947	0.948	0.941	0.849
28	0.898	0.809	0.789	0.859	0.875	0.978	0.968	0.969	0.969	0.969	0.969	0.968	0.968	0.969	0.972	0.976	0.969	0.967	0.969	0.966	0.967	0.972	0.970	0.871
29	0.911	0.825	0.805	0.875	0.888	0.983	0.970	0.970	0.970	0.970	0.971	0.969	0.969	0.971	0.975	0.979	0.971	0.968	0.969	0.967	0.969	0.976	0.978	0.885
30	0.942	0.853	0.831	0.907	0.917	1.003	0.981	0.979	0.979	0.979	0.982	0.978	0.979	0.983	0.989	0.995	0.983	0.977	0.977	0.977	0.983	0.994	1.005	0.915
31	0.635	0.638	0.648	0.639	0.618	0.733	0.802	0.818	0.815	0.825	0.795	0.824	0.811	0.792	0.778	0.765	0.786	0.814	0.835	0.812	0.777	0.743	0.685	0.629
32	0.643	0.643	0.652	0.645	0.626	0.741	0.807	0.823	0.820	0.830	0.801	0.829	0.816	0.798	0.785	0.771	0.792	0.819	0.839	0.817	0.783	0.750	0.693	0.636
33	0.644	0.650	0.660	0.650	0.627	0.735	0.801	0.818	0.815	0.825	0.795	0.823	0.810	0.792	0.779	0.765	0.786	0.813	0.835	0.812	0.778	0.744	0.689	0.639
34	0.644	0.654	0.664	0.652	0.627	0.731	0.798	0.815	0.812	0.822	0.792	0.820	0.807	0.789	0.775	0.762	0.783	0.810	0.832	0.809	0.774	0.741	0.686	0.640
35	0.645	0.654	0.665	0.652	0.628	0.733	0.799	0.815	0.813	0.823	0.792	0.821	0.808	0.790	0.776	0.763	0.784	0.811	0.832	0.809	0.775	0.742	0.688	0.641
36	0.650	0.657	0.667	0.656	0.633	0.738	0.803	0.819	0.816	0.826	0.796	0.824	0.812	0.794	0.780	0.767	0.788	0.815	0.835	0.813	0.779	0.747	0.694	0.646
37	0.654	0.670	0.682	0.666	0.636	0.730	0.795	0.811	0.809	0.818	0.788	0.817	0.804	0.786	0.772	0.759	0.780	0.807	0.828	0.805	0.771	0.739	0.689	0.652
38	0.672	0.685	0.694	0.683	0.654	0.745	0.805	0.820	0.818	0.827	0.799	0.826	0.813	0.797	0.784	0.772	0.791	0.816	0.836	0.815	0.783	0.753	0.707	0.670
39	0.696	0.710	0.719	0.709	0.677	0.757	0.810	0.825	0.822	0.831	0.805	0.830	0.818	0.803	0.791	0.780	0.797	0.821	0.840	0.819	0.790	0.763	0.724	0.695
40	0.721	0.736	0.745	0.736	0.702	0.768	0.816	0.829	0.827	0.835	0.811	0.834	0.823	0.809	0.798	0.789	0.804	0.826	0.844	0.824	0.797	0.773	0.741	0.721
41	0.603	0.747	0.789	0.699	0.583	0.565	0.648	0.673	0.669	0.684	0.639	0.682	0.662	0.635	0.615	0.597	0.626	0.667	0.699	0.664	0.615	0.574	0.548	0.635
42	0.604	0.750	0.792	0.702	0.584	0.564	0.647	0.672	0.668	0.682	0.637	0.681	0.661	0.634	0.613	0.596	0.625	0.666	0.698	0.663	0.613	0.573	0.548	0.636
43	0.608	0.769	0.815	0.716	0.589	0.550	0.633	0.659	0.654	0.670	0.623	0.668	0.647	0.619	0.599	0.581	0.610	0.652	0.686	0.650	0.599	0.558	0.539	0.645
44	0.617	0.759	0.800	0.713	0.597	0.576	0.655	0.679	0.675	0.689	0.645	0.687	0.668	0.642	0.622	0.606	0.633	0.673	0.704	0.670	0.622	0.583	0.562	0.649
45	0.622	0.763	0.803	0.718	0.602	0.580	0.658	0.681	0.677	0.692	0.649	0.690	0.671	0.645	0.626	0.610	0.636	0.675	0.706	0.673	0.626	0.588	0.567	0.654
46	0.628	0.787	0.832	0.736	0.608	0.564	0.641	0.665	0.661	0.675	0.631	0.674	0.654	0.628	0.608	0.592	0.619	0.659	0.691	0.656	0.608	0.571	0.558	0.665
47	0.631	0.775	0.816	0.729	0.610	0.582	0.657	0.680	0.676	0.691	0.648	0.689	0.670	0.644	0.626	0.610	0.636	0.675	0.705	0.672	0.625	0.589	0.571	0.663
48	0.643	0.782	0.821	0.740	0.623	0.594	0.665	0.688	0.684	0.698	0.657	0.696	0.678	0.653	0.636	0.621	0.645	0.682	0.712	0.680	0.635	0.600	0.586	0.674
49	0.671	0.834	0.877	0.783	0.650	0.586	0.651	0.674	0.670	0.684	0.642	0.682	0.663	0.639	0.621	0.607	0.631	0.668	0.698	0.666	0.621	0.589	0.591	0.710
50	0.681	0.855	0.900	0.801	0.660	0.580	0.643	0.666	0.662	0.676	0.635	0.674	0.656	0.631	0.614	0.600	0.623	0.660	0.691	0.658	0.614	0.583	0.590	0.723
51	1.003	1.669	1.814	1.463	0.991	0.261	0.256	0.288	0.282	0.304	0.244	0.301	0.273	0.239	0.222	0.218	0.232	0.281	0.330	0.279	0.225	0.235	0.482	1.186

52	1.004	1.670	1.815	1.464	0.992	0.262	0.256	0.289	0.283	0.305	0.245	0.302	0.273	0.240	0.223	0.219	0.233	0.282	0.330	0.279	0.226	0.236	0.484	1.188
53	0.994	1.652	1.795	1.448	0.982	0.265	0.261	0.294	0.287	0.309	0.249	0.307	0.278	0.245	0.228	0.223	0.237	0.286	0.335	0.284	0.230	0.240	0.482	1.175
54	1.009	1.672	1.816	1.468	0.997	0.268	0.261	0.293	0.287	0.308	0.249	0.306	0.278	0.245	0.228	0.224	0.237	0.286	0.334	0.283	0.231	0.242	0.490	1.193
55	1.037	1.713	1.858	1.506	1.025	0.272	0.257	0.289	0.283	0.304	0.246	0.302	0.274	0.242	0.226	0.224	0.235	0.282	0.330	0.280	0.229	0.244	0.503	1.224
56	1.108	1.817	1.968	1.603	1.095	0.282	0.248	0.277	0.271	0.292	0.238	0.289	0.263	0.234	0.222	0.224	0.228	0.270	0.316	0.268	0.224	0.249	0.537	1.305
57	1.107	1.810	1.959	1.598	1.094	0.287	0.254	0.282	0.277	0.297	0.244	0.295	0.268	0.240	0.227	0.229	0.234	0.276	0.322	0.274	0.229	0.255	0.541	1.303
58	1.147	1.866	2.017	1.652	1.133	0.296	0.250	0.277	0.272	0.291	0.242	0.289	0.264	0.239	0.229	0.233	0.233	0.271	0.316	0.269	0.230	0.262	0.562	1.348
59	1.159	1.877	2.027	1.663	1.146	0.302	0.255	0.282	0.276	0.296	0.246	0.294	0.268	0.243	0.233	0.237	0.238	0.275	0.320	0.273	0.234	0.267	0.571	1.360
60	1.149	1.855	2.003	1.645	1.135	0.308	0.263	0.290	0.285	0.304	0.255	0.302	0.277	0.252	0.242	0.246	0.246	0.284	0.328	0.282	0.243	0.274	0.572	1.347
61	2.329	3.571	3.796	3.254	2.330	0.484	0.122	0.110	0.110	0.113	0.134	0.113	0.112	0.140	0.186	0.253	0.155	0.111	0.127	0.112	0.179	0.375	1.148	2.695
62	2.418	3.683	3.909	3.363	2.419	0.514	0.129	0.115	0.115	0.116	0.143	0.116	0.118	0.150	0.199	0.271	0.166	0.116	0.127	0.117	0.192	0.400	1.204	2.792
63	2.347	3.586	3.809	3.271	2.346	0.498	0.131	0.118	0.118	0.121	0.144	0.120	0.121	0.150	0.197	0.265	0.165	0.119	0.133	0.120	0.190	0.389	1.165	2.712
64	2.373	3.619	3.843	3.303	2.372	0.506	0.132	0.119	0.119	0.121	0.145	0.121	0.122	0.152	0.199	0.269	0.167	0.120	0.133	0.121	0.193	0.395	1.181	2.741
65	2.452	3.720	3.946	3.401	2.452	0.531	0.137	0.122	0.123	0.123	0.151	0.122	0.125	0.158	0.210	0.283	0.175	0.123	0.132	0.124	0.202	0.415	1.229	2.828
66	2.366	3.601	3.822	3.288	2.364	0.513	0.141	0.128	0.128	0.129	0.154	0.129	0.131	0.160	0.208	0.277	0.176	0.129	0.141	0.130	0.201	0.403	1.183	2.731
67	2.452	3.710	3.934	3.394	2.450	0.540	0.147	0.129	0.130	0.129	0.160	0.129	0.134	0.168	0.219	0.293	0.184	0.131	0.138	0.132	0.212	0.424	1.235	2.825
68	2.385	3.618	3.838	3.306	2.383	0.523	0.148	0.134	0.135	0.135	0.160	0.135	0.138	0.167	0.215	0.285	0.182	0.136	0.146	0.137	0.208	0.412	1.197	2.750
69	2.334	3.548	3.766	3.239	2.332	0.512	0.151	0.139	0.139	0.140	0.162	0.140	0.141	0.168	0.213	0.281	0.183	0.139	0.152	0.140	0.207	0.404	1.170	2.693
70	2.656	3.969	4.197	3.646	2.654	0.603	0.159	0.135	0.138	0.133	0.176	0.133	0.142	0.184	0.244	0.328	0.204	0.138	0.140	0.140	0.235	0.475	1.360	3.048
71	2.810	4.211	4.453	3.869	2.817	0.609	0.128	0.098	0.102	0.094	0.147	0.094	0.109	0.157	0.222	0.313	0.179	0.103	0.100	0.106	0.213	0.472	1.425	3.229
72	2.793	4.188	4.430	3.847	2.799	0.605	0.128	0.099	0.102	0.095	0.147	0.095	0.109	0.156	0.221	0.311	0.178	0.104	0.100	0.106	0.212	0.469	1.416	3.209
73	2.834	4.240	4.483	3.898	2.841	0.618	0.131	0.100	0.104	0.096	0.150	0.096	0.111	0.160	0.226	0.319	0.182	0.105	0.101	0.108	0.217	0.480	1.441	3.255
74	2.858	4.269	4.512	3.927	2.864	0.627	0.134	0.103	0.106	0.097	0.154	0.098	0.114	0.163	0.231	0.324	0.186	0.107	0.101	0.110	0.221	0.487	1.456	3.281
75	2.789	4.177	4.418	3.839	2.793	0.609	0.133	0.104	0.108	0.100	0.152	0.101	0.114	0.161	0.226	0.316	0.183	0.108	0.104	0.111	0.217	0.473	1.417	3.203
76	2.750	4.127	4.367	3.791	2.753	0.600	0.134	0.106	0.109	0.102	0.152	0.102	0.115	0.161	0.224	0.312	0.182	0.110	0.105	0.112	0.215	0.466	1.396	3.160
77	2.909	4.333	4.578	3.991	2.912	0.648	0.141	0.108	0.112	0.101	0.161	0.102	0.119	0.171	0.241	0.337	0.195	0.112	0.101	0.115	0.231	0.503	1.492	3.335
78	2.925	4.352	4.597	4.009	2.929	0.653	0.142	0.108	0.112	0.102	0.163	0.102	0.121	0.173	0.244	0.341	0.197	0.113	0.102	0.116	0.234	0.508	1.501	3.352
79	3.006	4.450	4.695	4.107	3.010	0.685	0.154	0.118	0.123	0.111	0.176	0.112	0.131	0.186	0.260	0.361	0.211	0.124	0.109	0.126	0.249	0.535	1.556	3.440

80	2.979	4.415	4.660	4.075	2.982	0.682	0.156	0.121	0.126	0.113	0.178	0.114	0.134	0.188	0.262	0.362	0.213	0.126	0.111	0.129	0.250	0.533	1.544	3.409
81	2.716	4.086	4.325	3.749	2.723	0.586	0.128	0.101	0.104	0.099	0.145	0.099	0.110	0.154	0.216	0.302	0.175	0.105	0.105	0.107	0.207	0.454	1.371	3.125
82	2.710	4.076	4.315	3.740	2.716	0.585	0.128	0.103	0.105	0.100	0.146	0.101	0.111	0.155	0.216	0.302	0.175	0.106	0.107	0.108	0.208	0.454	1.368	3.118
83	2.815	4.211	4.452	3.870	2.822	0.616	0.134	0.104	0.107	0.101	0.153	0.101	0.114	0.162	0.228	0.319	0.184	0.108	0.105	0.111	0.219	0.479	1.431	3.233
84	2.789	4.172	4.411	3.834	2.796	0.614	0.137	0.108	0.111	0.105	0.156	0.106	0.118	0.165	0.230	0.320	0.187	0.113	0.110	0.115	0.221	0.478	1.419	3.203
85	2.841	4.240	4.480	3.900	2.848	0.629	0.139	0.109	0.112	0.105	0.159	0.105	0.119	0.168	0.235	0.328	0.191	0.113	0.109	0.116	0.226	0.490	1.450	3.260
86	2.853	4.252	4.492	3.912	2.860	0.635	0.142	0.111	0.115	0.107	0.162	0.108	0.122	0.171	0.239	0.332	0.194	0.116	0.112	0.118	0.230	0.495	1.459	3.272
87	2.839	4.233	4.473	3.895	2.844	0.634	0.144	0.114	0.117	0.110	0.164	0.110	0.124	0.173	0.241	0.333	0.196	0.118	0.112	0.121	0.231	0.495	1.453	3.256
88	2.981	4.411	4.654	4.069	2.986	0.679	0.154	0.119	0.122	0.113	0.175	0.114	0.131	0.186	0.259	0.359	0.211	0.123	0.114	0.126	0.249	0.532	1.540	3.411
89	3.108	4.574	4.820	4.228	3.115	0.721	0.162	0.123	0.127	0.116	0.186	0.117	0.137	0.197	0.276	0.383	0.224	0.129	0.114	0.132	0.265	0.565	1.620	3.550
90	2.995	4.419	4.660	4.079	3.001	0.691	0.162	0.126	0.130	0.121	0.184	0.122	0.138	0.195	0.269	0.369	0.220	0.131	0.123	0.134	0.259	0.543	1.554	3.424
91	3.109	4.602	4.854	4.248	3.118	0.696	0.139	0.100	0.105	0.090	0.162	0.091	0.114	0.173	0.252	0.357	0.200	0.106	0.086	0.109	0.241	0.540	1.603	3.558
92	3.105	4.595	4.847	4.242	3.114	0.696	0.139	0.101	0.105	0.091	0.163	0.092	0.115	0.174	0.252	0.358	0.200	0.107	0.088	0.110	0.241	0.539	1.601	3.554
93	3.214	4.735	4.990	4.378	3.224	0.730	0.145	0.103	0.109	0.092	0.170	0.094	0.119	0.182	0.265	0.376	0.211	0.110	0.086	0.113	0.253	0.566	1.668	3.673
94	3.085	4.558	4.806	4.208	3.091	0.699	0.147	0.109	0.114	0.100	0.171	0.101	0.123	0.182	0.259	0.364	0.208	0.115	0.097	0.118	0.248	0.544	1.596	3.528
95	3.174	4.658	4.906	4.310	3.181	0.740	0.167	0.126	0.131	0.116	0.192	0.117	0.141	0.204	0.285	0.393	0.231	0.133	0.110	0.136	0.273	0.580	1.659	3.623
96	3.059	4.509	4.754	4.166	3.064	0.708	0.164	0.126	0.131	0.117	0.187	0.118	0.140	0.198	0.274	0.378	0.223	0.132	0.114	0.135	0.263	0.555	1.592	3.496
97	3.176	4.654	4.900	4.308	3.181	0.749	0.175	0.133	0.139	0.123	0.199	0.124	0.149	0.211	0.293	0.402	0.239	0.140	0.117	0.143	0.281	0.589	1.667	3.623
98	3.031	4.487	4.734	4.141	3.037	0.688	0.149	0.112	0.117	0.104	0.172	0.105	0.126	0.183	0.258	0.361	0.208	0.118	0.102	0.121	0.247	0.537	1.567	3.469
99	3.155	4.645	4.894	4.295	3.160	0.728	0.157	0.116	0.121	0.106	0.181	0.108	0.131	0.193	0.274	0.383	0.220	0.122	0.102	0.126	0.262	0.568	1.643	3.604
100	3.144	4.628	4.877	4.279	3.149	0.726	0.158	0.118	0.123	0.109	0.183	0.110	0.133	0.194	0.275	0.383	0.221	0.125	0.104	0.128	0.263	0.568	1.637	3.592
101	2.066	3.217	3.432	2.915	2.065	0.420	0.123	0.120	0.119	0.127	0.132	0.126	0.118	0.136	0.171	0.225	0.147	0.119	0.145	0.119	0.166	0.328	1.000	2.402
102	2.041	3.181	3.394	2.880	2.040	0.416	0.125	0.125	0.123	0.132	0.133	0.131	0.121	0.137	0.172	0.225	0.148	0.123	0.150	0.123	0.167	0.325	0.988	2.374
103	2.072	3.222	3.435	2.920	2.071	0.426	0.127	0.125	0.123	0.131	0.136	0.130	0.122	0.140	0.175	0.230	0.151	0.123	0.148	0.123	0.170	0.333	1.007	2.408
104	2.139	3.312	3.528	3.007	2.137	0.445	0.130	0.124	0.123	0.128	0.139	0.127	0.123	0.144	0.182	0.240	0.156	0.123	0.142	0.123	0.176	0.348	1.047	2.482
105	2.224	3.420	3.639	3.113	2.223	0.470	0.134	0.126	0.125	0.128	0.144	0.128	0.126	0.150	0.192	0.254	0.163	0.126	0.141	0.126	0.185	0.368	1.098	2.576
106	2.226	3.420	3.638	3.113	2.224	0.474	0.138	0.127	0.127	0.130	0.148	0.130	0.129	0.154	0.196	0.258	0.167	0.128	0.142	0.128	0.189	0.372	1.101	2.577
107	2.334	3.557	3.778	3.248	2.331	0.511	0.147	0.132	0.133	0.133	0.159	0.133	0.135	0.166	0.212	0.280	0.181	0.133	0.141	0.134	0.205	0.402	1.170	2.694

108	2.212	3.350	3.555	3.059	2.206	0.518	0.185	0.173	0.173	0.176	0.195	0.175	0.176	0.201	0.243	0.305	0.214	0.174	0.186	0.175	0.237	0.418	1.128	2.548
109	2.205	3.285	3.477	3.013	2.197	0.569	0.236	0.223	0.224	0.225	0.247	0.225	0.226	0.253	0.296	0.359	0.266	0.224	0.235	0.225	0.289	0.471	1.163	2.526
110	2.351	3.522	3.730	3.227	2.346	0.562	0.193	0.177	0.178	0.179	0.206	0.179	0.181	0.213	0.261	0.330	0.229	0.178	0.189	0.180	0.255	0.454	1.212	2.700
111	3.125	4.618	4.870	4.264	3.135	0.704	0.142	0.103	0.108	0.093	0.166	0.094	0.117	0.178	0.256	0.363	0.204	0.109	0.091	0.112	0.245	0.547	1.615	3.575
112	3.146	4.644	4.896	4.290	3.155	0.713	0.145	0.105	0.110	0.095	0.169	0.096	0.120	0.181	0.261	0.369	0.208	0.111	0.092	0.115	0.250	0.554	1.629	3.598
113	3.110	4.595	4.845	4.243	3.118	0.704	0.146	0.107	0.112	0.098	0.170	0.100	0.121	0.181	0.260	0.366	0.208	0.113	0.095	0.116	0.248	0.548	1.609	3.557
114	3.156	4.654	4.905	4.300	3.165	0.718	0.147	0.107	0.112	0.097	0.172	0.099	0.122	0.183	0.264	0.372	0.211	0.113	0.094	0.117	0.252	0.558	1.636	3.608
115	3.224	4.737	4.990	4.382	3.233	0.742	0.154	0.111	0.116	0.101	0.179	0.102	0.127	0.191	0.275	0.387	0.220	0.118	0.097	0.121	0.263	0.578	1.679	3.681
116	3.189	4.690	4.941	4.337	3.198	0.732	0.153	0.111	0.117	0.102	0.178	0.103	0.127	0.190	0.272	0.382	0.218	0.118	0.100	0.122	0.261	0.571	1.658	3.643
117	3.197	4.698	4.948	4.345	3.205	0.736	0.156	0.114	0.119	0.104	0.181	0.105	0.129	0.193	0.275	0.386	0.221	0.120	0.101	0.124	0.264	0.575	1.665	3.651
118	3.195	4.693	4.942	4.340	3.204	0.737	0.157	0.115	0.120	0.106	0.182	0.107	0.130	0.194	0.276	0.387	0.222	0.121	0.105	0.125	0.265	0.576	1.664	3.649
119	3.297	4.822	5.074	4.466	3.306	0.769	0.163	0.117	0.123	0.107	0.189	0.108	0.134	0.202	0.289	0.405	0.232	0.125	0.105	0.128	0.277	0.602	1.726	3.760
120	3.231	4.732	4.980	4.380	3.240	0.754	0.165	0.123	0.128	0.114	0.190	0.115	0.138	0.203	0.287	0.399	0.231	0.130	0.112	0.133	0.275	0.592	1.691	3.686
121	2.615	3.952	4.187	3.619	2.619	0.558	0.125	0.103	0.104	0.102	0.141	0.102	0.109	0.149	0.206	0.288	0.168	0.105	0.111	0.107	0.199	0.433	1.312	3.012
122	2.638	3.980	4.216	3.648	2.642	0.566	0.127	0.104	0.105	0.102	0.143	0.102	0.111	0.151	0.210	0.292	0.171	0.106	0.111	0.108	0.202	0.439	1.326	3.037
123	2.641	3.981	4.216	3.650	2.645	0.572	0.132	0.108	0.110	0.107	0.148	0.107	0.115	0.156	0.215	0.298	0.176	0.111	0.115	0.113	0.207	0.444	1.333	3.040
124	2.669	4.014	4.249	3.682	2.672	0.583	0.135	0.111	0.113	0.111	0.152	0.111	0.118	0.161	0.221	0.305	0.181	0.114	0.118	0.116	0.212	0.454	1.351	3.070
125	2.666	4.009	4.244	3.679	2.668	0.585	0.138	0.113	0.115	0.111	0.155	0.111	0.121	0.163	0.224	0.308	0.183	0.116	0.117	0.118	0.215	0.456	1.352	3.065
126	2.629	3.955	4.187	3.628	2.631	0.578	0.140	0.119	0.120	0.117	0.156	0.118	0.125	0.164	0.223	0.306	0.184	0.121	0.125	0.123	0.215	0.451	1.332	3.024
127	2.625	3.947	4.179	3.621	2.626	0.580	0.145	0.123	0.125	0.121	0.161	0.121	0.129	0.169	0.226	0.308	0.187	0.125	0.128	0.127	0.218	0.454	1.332	3.018
128	2.668	4.002	4.235	3.675	2.669	0.593	0.146	0.124	0.125	0.122	0.163	0.122	0.130	0.171	0.230	0.315	0.191	0.126	0.127	0.128	0.222	0.463	1.358	3.066
129	2.751	4.109	4.344	3.778	2.752	0.619	0.151	0.125	0.128	0.122	0.169	0.122	0.134	0.178	0.241	0.329	0.198	0.129	0.125	0.131	0.231	0.484	1.408	3.156
130	2.733	4.084	4.318	3.755	2.734	0.618	0.154	0.129	0.132	0.126	0.172	0.126	0.137	0.180	0.243	0.331	0.201	0.132	0.129	0.134	0.233	0.484	1.401	3.136
131	2.009	3.139	3.350	2.839	2.010	0.406	0.125	0.127	0.125	0.136	0.131	0.134	0.123	0.135	0.167	0.219	0.145	0.125	0.154	0.125	0.163	0.318	0.968	2.339
132	2.046	3.181	3.392	2.882	2.046	0.422	0.131	0.132	0.130	0.139	0.138	0.138	0.128	0.142	0.176	0.229	0.153	0.130	0.156	0.130	0.171	0.331	0.994	2.377
133	2.072	3.216	3.429	2.915	2.072	0.428	0.131	0.130	0.128	0.138	0.139	0.137	0.128	0.143	0.178	0.232	0.154	0.129	0.155	0.128	0.173	0.336	1.009	2.406
134	2.121	3.281	3.495	2.978	2.121	0.442	0.133	0.131	0.129	0.137	0.141	0.136	0.129	0.145	0.182	0.240	0.157	0.130	0.153	0.130	0.177	0.347	1.038	2.460
135	2.238	3.441	3.661	3.131	2.239	0.470	0.132	0.125	0.124	0.129	0.141	0.128	0.125	0.147	0.189	0.252	0.160	0.125	0.142	0.125	0.183	0.368	1.104	2.592

136	2.104	3.251	3.462	2.950	2.103	0.443	0.140	0.139	0.137	0.145	0.147	0.144	0.136	0.151	0.187	0.243	0.162	0.137	0.162	0.138	0.182	0.349	1.032	2.440
137	2.180	3.349	3.563	3.047	2.179	0.468	0.145	0.138	0.137	0.143	0.154	0.142	0.138	0.158	0.197	0.257	0.171	0.138	0.157	0.138	0.192	0.369	1.079	2.523
138	2.301	3.505	3.723	3.198	2.300	0.504	0.152	0.141	0.141	0.143	0.162	0.143	0.143	0.168	0.212	0.277	0.182	0.142	0.154	0.143	0.206	0.398	1.153	2.656
139	2.373	3.597	3.816	3.288	2.373	0.527	0.154	0.141	0.141	0.143	0.167	0.143	0.144	0.173	0.221	0.291	0.189	0.142	0.154	0.143	0.215	0.417	1.196	2.735
140	2.275	3.455	3.668	3.154	2.274	0.511	0.164	0.156	0.155	0.159	0.175	0.159	0.156	0.180	0.224	0.288	0.194	0.156	0.171	0.156	0.218	0.406	1.148	2.623
141	1.626	2.607	2.798	2.332	1.624	0.324	0.147	0.166	0.162	0.178	0.143	0.177	0.156	0.143	0.155	0.188	0.145	0.162	0.201	0.161	0.154	0.259	0.763	1.908
142	1.671	2.669	2.863	2.392	1.668	0.333	0.143	0.161	0.157	0.173	0.141	0.171	0.151	0.141	0.156	0.191	0.144	0.157	0.195	0.156	0.154	0.266	0.786	1.958
143	1.657	2.646	2.839	2.370	1.655	0.332	0.148	0.167	0.162	0.178	0.145	0.177	0.157	0.144	0.157	0.192	0.147	0.163	0.201	0.161	0.156	0.265	0.780	1.942
144	1.701	2.707	2.901	2.428	1.699	0.343	0.146	0.163	0.159	0.174	0.144	0.173	0.154	0.144	0.160	0.197	0.148	0.159	0.196	0.158	0.159	0.274	0.805	1.991
145	1.668	2.656	2.847	2.380	1.665	0.339	0.154	0.171	0.167	0.182	0.151	0.181	0.161	0.150	0.163	0.198	0.153	0.167	0.204	0.166	0.162	0.272	0.790	1.953
146	1.609	2.570	2.758	2.301	1.605	0.332	0.161	0.180	0.176	0.192	0.157	0.190	0.170	0.157	0.167	0.199	0.158	0.176	0.214	0.174	0.166	0.268	0.763	1.885
147	1.709	2.700	2.891	2.425	1.707	0.358	0.164	0.179	0.175	0.190	0.162	0.189	0.171	0.162	0.175	0.211	0.165	0.176	0.211	0.175	0.174	0.289	0.819	1.996
148	1.771	2.782	2.975	2.504	1.769	0.373	0.164	0.177	0.174	0.188	0.163	0.186	0.170	0.163	0.179	0.217	0.167	0.174	0.208	0.174	0.178	0.300	0.854	2.065
149	1.725	2.708	2.896	2.436	1.721	0.373	0.176	0.191	0.187	0.202	0.174	0.200	0.183	0.174	0.188	0.224	0.177	0.188	0.222	0.187	0.187	0.303	0.837	2.010
150	1.720	2.700	2.887	2.428	1.715	0.373	0.178	0.193	0.189	0.203	0.176	0.202	0.184	0.176	0.189	0.225	0.178	0.189	0.224	0.189	0.188	0.303	0.834	2.004
151	1.345	2.196	2.370	1.948	1.339	0.285	0.184	0.210	0.204	0.224	0.176	0.222	0.197	0.174	0.171	0.189	0.171	0.204	0.248	0.202	0.172	0.238	0.629	1.586
152	1.399	2.265	2.439	2.014	1.392	0.300	0.186	0.210	0.205	0.223	0.179	0.222	0.198	0.177	0.177	0.196	0.175	0.205	0.247	0.203	0.178	0.250	0.660	1.645
153	1.380	2.236	2.409	1.987	1.373	0.298	0.189	0.214	0.208	0.227	0.182	0.225	0.201	0.180	0.179	0.197	0.178	0.208	0.251	0.207	0.180	0.249	0.651	1.623
154	1.431	2.309	2.484	2.056	1.425	0.308	0.185	0.208	0.203	0.222	0.179	0.220	0.196	0.178	0.178	0.200	0.176	0.203	0.245	0.202	0.179	0.256	0.678	1.681
155	1.499	2.403	2.583	2.145	1.494	0.321	0.180	0.201	0.196	0.214	0.175	0.212	0.190	0.174	0.178	0.203	0.174	0.196	0.237	0.195	0.179	0.264	0.713	1.758
156	1.448	2.326	2.502	2.074	1.442	0.316	0.188	0.210	0.205	0.223	0.183	0.221	0.199	0.181	0.185	0.206	0.181	0.205	0.247	0.204	0.185	0.263	0.690	1.699
157	1.396	2.249	2.421	2.003	1.388	0.312	0.195	0.218	0.213	0.232	0.189	0.230	0.206	0.187	0.188	0.208	0.186	0.213	0.255	0.211	0.188	0.261	0.667	1.639
158	1.458	2.336	2.511	2.085	1.450	0.323	0.191	0.212	0.207	0.224	0.186	0.223	0.201	0.185	0.189	0.212	0.184	0.207	0.247	0.206	0.189	0.269	0.699	1.709
159	1.505	2.396	2.573	2.143	1.497	0.338	0.193	0.212	0.207	0.223	0.188	0.222	0.201	0.188	0.194	0.219	0.188	0.207	0.245	0.206	0.194	0.281	0.727	1.760
160	1.550	2.449	2.625	2.195	1.542	0.354	0.199	0.217	0.213	0.229	0.195	0.227	0.207	0.195	0.204	0.231	0.196	0.213	0.250	0.212	0.203	0.295	0.755	1.809
161	1.918	3.007	3.212	2.714	1.916	0.389	0.133	0.142	0.138	0.151	0.136	0.150	0.135	0.139	0.167	0.214	0.147	0.139	0.170	0.138	0.163	0.307	0.921	2.235
162	1.971	3.076	3.283	2.781	1.969	0.404	0.134	0.141	0.138	0.149	0.138	0.148	0.135	0.141	0.172	0.221	0.150	0.138	0.168	0.138	0.168	0.318	0.951	2.294
163	1.984	3.093	3.300	2.797	1.981	0.409	0.136	0.141	0.139	0.149	0.141	0.148	0.136	0.144	0.175	0.225	0.153	0.139	0.167	0.139	0.171	0.323	0.960	2.308

164	1.982	3.089	3.296	2.794	1.980	0.410	0.138	0.142	0.140	0.151	0.142	0.149	0.137	0.145	0.175	0.226	0.154	0.140	0.169	0.140	0.171	0.323	0.960	2.305
165	2.002	3.116	3.323	2.820	2.000	0.415	0.138	0.143	0.140	0.150	0.142	0.149	0.138	0.145	0.177	0.229	0.155	0.141	0.168	0.141	0.173	0.328	0.972	2.328
166	2.028	3.150	3.358	2.853	2.024	0.424	0.139	0.140	0.138	0.148	0.145	0.147	0.136	0.148	0.181	0.234	0.158	0.138	0.165	0.138	0.177	0.334	0.988	2.356
167	2.062	3.192	3.401	2.895	2.057	0.437	0.143	0.143	0.142	0.150	0.149	0.149	0.140	0.154	0.188	0.242	0.164	0.142	0.165	0.142	0.183	0.345	1.011	2.392
168	2.083	3.217	3.426	2.920	2.079	0.445	0.147	0.146	0.144	0.152	0.153	0.151	0.143	0.158	0.193	0.248	0.168	0.144	0.167	0.144	0.188	0.352	1.026	2.416
169	2.080	3.209	3.417	2.913	2.074	0.449	0.151	0.149	0.147	0.155	0.158	0.154	0.147	0.162	0.197	0.252	0.172	0.147	0.170	0.147	0.192	0.356	1.027	2.411
170	2.169	3.323	3.533	3.024	2.164	0.476	0.155	0.149	0.148	0.154	0.163	0.153	0.149	0.168	0.207	0.267	0.180	0.148	0.168	0.149	0.201	0.377	1.080	2.509
171	2.704	4.068	4.306	3.733	2.708	0.586	0.131	0.104	0.107	0.100	0.148	0.101	0.113	0.157	0.218	0.304	0.177	0.108	0.105	0.110	0.209	0.454	1.368	3.111
172	2.728	4.097	4.336	3.762	2.731	0.594	0.133	0.106	0.109	0.101	0.151	0.102	0.115	0.160	0.222	0.309	0.180	0.109	0.105	0.112	0.213	0.461	1.382	3.136
173	2.793	4.183	4.424	3.844	2.797	0.612	0.135	0.106	0.109	0.101	0.154	0.101	0.116	0.163	0.228	0.318	0.185	0.110	0.103	0.112	0.219	0.476	1.421	3.208
174	2.688	4.042	4.279	3.709	2.691	0.585	0.134	0.109	0.112	0.105	0.152	0.106	0.118	0.160	0.221	0.306	0.180	0.112	0.110	0.114	0.212	0.455	1.361	3.091
175	2.763	4.138	4.377	3.802	2.766	0.608	0.138	0.111	0.114	0.106	0.157	0.107	0.120	0.166	0.230	0.318	0.187	0.114	0.109	0.117	0.220	0.473	1.406	3.173
176	2.891	4.304	4.546	3.964	2.894	0.647	0.144	0.113	0.116	0.107	0.165	0.107	0.124	0.175	0.244	0.339	0.198	0.117	0.106	0.120	0.234	0.504	1.484	3.314
177	2.716	4.071	4.307	3.740	2.717	0.603	0.144	0.118	0.121	0.114	0.162	0.114	0.127	0.171	0.233	0.319	0.191	0.122	0.115	0.124	0.223	0.471	1.385	3.120
178	2.702	4.031	4.261	3.707	2.702	0.622	0.167	0.140	0.143	0.136	0.185	0.136	0.149	0.194	0.256	0.341	0.214	0.144	0.137	0.146	0.246	0.491	1.392	3.099
179	2.746	4.087	4.318	3.763	2.747	0.637	0.171	0.142	0.146	0.137	0.190	0.137	0.153	0.199	0.262	0.350	0.220	0.146	0.137	0.149	0.253	0.503	1.420	3.147
180	2.781	4.131	4.363	3.806	2.782	0.647	0.173	0.143	0.147	0.137	0.192	0.138	0.154	0.201	0.266	0.356	0.223	0.147	0.136	0.150	0.256	0.512	1.441	3.185
181	3.599	5.233	5.499	4.863	3.611	0.853	0.168	0.114	0.121	0.099	0.199	0.101	0.135	0.214	0.314	0.445	0.248	0.123	0.085	0.127	0.299	0.665	1.905	4.096
182	3.681	5.336	5.604	4.965	3.694	0.882	0.176	0.119	0.127	0.103	0.208	0.105	0.141	0.224	0.328	0.463	0.259	0.128	0.087	0.133	0.312	0.689	1.958	4.185
183	3.606	5.237	5.502	4.868	3.617	0.860	0.174	0.120	0.127	0.104	0.205	0.107	0.140	0.220	0.320	0.452	0.254	0.129	0.090	0.133	0.305	0.672	1.913	4.102
184	3.650	5.288	5.553	4.919	3.661	0.876	0.179	0.123	0.131	0.108	0.212	0.110	0.145	0.227	0.329	0.462	0.262	0.133	0.092	0.137	0.314	0.686	1.941	4.149
185	3.523	5.127	5.389	4.763	3.532	0.839	0.174	0.122	0.129	0.108	0.204	0.110	0.142	0.219	0.316	0.443	0.252	0.130	0.094	0.134	0.301	0.657	1.866	4.009
186	3.582	5.201	5.464	4.835	3.593	0.857	0.178	0.124	0.131	0.109	0.209	0.111	0.144	0.224	0.323	0.454	0.258	0.133	0.094	0.137	0.308	0.671	1.902	4.074
187	3.641	5.268	5.531	4.902	3.650	0.883	0.188	0.132	0.140	0.116	0.221	0.119	0.154	0.236	0.338	0.472	0.271	0.141	0.100	0.146	0.323	0.694	1.943	4.137
188	3.623	5.244	5.506	4.880	3.632	0.880	0.190	0.134	0.141	0.118	0.222	0.120	0.155	0.237	0.339	0.471	0.271	0.143	0.103	0.147	0.323	0.692	1.934	4.116
189	3.429	4.983	5.238	4.629	3.435	0.832	0.190	0.142	0.148	0.128	0.218	0.130	0.160	0.232	0.326	0.449	0.264	0.149	0.116	0.153	0.311	0.655	1.824	3.900
190	3.504	5.041	5.289	4.697	3.510	0.889	0.227	0.174	0.181	0.159	0.258	0.161	0.194	0.273	0.370	0.497	0.306	0.182	0.146	0.187	0.355	0.709	1.895	3.973
191	2.696	4.061	4.299	3.724	2.702	0.578	0.126	0.101	0.103	0.098	0.143	0.098	0.108	0.152	0.212	0.297	0.172	0.104	0.104	0.106	0.204	0.448	1.359	3.103

192	2.730	4.103	4.343	3.766	2.736	0.590	0.128	0.102	0.105	0.099	0.146	0.100	0.110	0.155	0.217	0.304	0.176	0.106	0.104	0.108	0.208	0.457	1.380	3.140
193	2.812	4.208	4.449	3.867	2.818	0.614	0.132	0.103	0.106	0.100	0.151	0.100	0.112	0.160	0.226	0.317	0.182	0.107	0.104	0.109	0.217	0.476	1.428	3.229
194	2.838	4.240	4.482	3.900	2.843	0.625	0.136	0.106	0.109	0.101	0.155	0.102	0.117	0.165	0.232	0.324	0.187	0.110	0.104	0.113	0.222	0.485	1.447	3.257
195	2.890	4.307	4.550	3.965	2.895	0.641	0.138	0.108	0.111	0.102	0.158	0.103	0.118	0.168	0.237	0.332	0.191	0.112	0.104	0.114	0.228	0.498	1.478	3.315
196	2.795	4.179	4.419	3.842	2.798	0.617	0.139	0.111	0.114	0.106	0.157	0.106	0.120	0.166	0.232	0.322	0.188	0.115	0.108	0.117	0.222	0.480	1.424	3.209
197	2.937	4.363	4.607	4.020	2.942	0.659	0.145	0.113	0.117	0.107	0.166	0.108	0.124	0.176	0.247	0.345	0.200	0.118	0.107	0.120	0.237	0.514	1.509	3.365
198	2.920	4.341	4.584	4.000	2.924	0.658	0.148	0.116	0.120	0.110	0.168	0.110	0.127	0.178	0.249	0.346	0.202	0.121	0.108	0.123	0.239	0.513	1.502	3.346
199	2.910	4.323	4.565	3.984	2.913	0.659	0.150	0.118	0.121	0.112	0.171	0.112	0.129	0.181	0.252	0.348	0.205	0.122	0.112	0.125	0.241	0.515	1.498	3.334
200	2.780	4.148	4.384	3.816	2.782	0.628	0.153	0.125	0.128	0.120	0.171	0.121	0.134	0.180	0.245	0.335	0.202	0.129	0.121	0.131	0.236	0.492	1.426	3.189
201	1.753	2.769	2.965	2.492	1.749	0.367	0.153	0.166	0.162	0.175	0.153	0.174	0.158	0.155	0.175	0.215	0.160	0.162	0.194	0.161	0.172	0.294	0.843	2.046
202	1.820	2.861	3.060	2.581	1.815	0.384	0.151	0.160	0.157	0.168	0.153	0.167	0.153	0.156	0.180	0.223	0.162	0.156	0.186	0.156	0.176	0.307	0.881	2.121
203	1.815	2.850	3.048	2.571	1.810	0.386	0.156	0.165	0.162	0.174	0.158	0.172	0.159	0.160	0.183	0.226	0.166	0.162	0.191	0.161	0.179	0.309	0.881	2.114
204	1.833	2.872	3.070	2.593	1.828	0.392	0.157	0.165	0.163	0.174	0.160	0.172	0.159	0.162	0.186	0.229	0.169	0.162	0.191	0.162	0.182	0.314	0.892	2.134
205	1.873	2.928	3.127	2.646	1.869	0.402	0.157	0.164	0.161	0.172	0.160	0.171	0.158	0.162	0.188	0.233	0.170	0.161	0.189	0.160	0.184	0.321	0.915	2.179
206	1.906	2.970	3.171	2.687	1.902	0.411	0.159	0.165	0.162	0.173	0.162	0.171	0.160	0.165	0.191	0.237	0.172	0.162	0.189	0.162	0.187	0.328	0.934	2.216
207	1.944	3.013	3.213	2.729	1.939	0.426	0.163	0.169	0.166	0.176	0.167	0.175	0.164	0.170	0.199	0.248	0.179	0.166	0.192	0.166	0.195	0.342	0.959	2.256
208	1.864	2.902	3.098	2.624	1.859	0.410	0.171	0.177	0.175	0.185	0.173	0.184	0.172	0.176	0.200	0.244	0.183	0.174	0.201	0.174	0.197	0.331	0.918	2.166
209	2.049	3.144	3.346	2.857	2.046	0.460	0.175	0.175	0.174	0.181	0.181	0.180	0.173	0.185	0.217	0.270	0.195	0.174	0.195	0.174	0.213	0.371	1.024	2.370
210	1.992	3.055	3.252	2.775	1.988	0.457	0.186	0.189	0.187	0.195	0.191	0.194	0.185	0.195	0.224	0.275	0.203	0.187	0.209	0.187	0.220	0.371	1.000	2.303
211	1.132	1.881	2.040	1.655	1.123	0.261	0.215	0.246	0.240	0.261	0.205	0.259	0.231	0.202	0.190	0.194	0.196	0.239	0.287	0.237	0.192	0.226	0.531	1.340
212	1.132	1.879	2.038	1.654	1.123	0.262	0.217	0.247	0.241	0.263	0.207	0.260	0.233	0.204	0.192	0.196	0.198	0.241	0.288	0.238	0.194	0.227	0.532	1.340
213	1.153	1.906	2.065	1.680	1.143	0.268	0.218	0.247	0.241	0.262	0.208	0.260	0.233	0.205	0.194	0.200	0.199	0.241	0.288	0.238	0.196	0.232	0.544	1.362
214	1.141	1.887	2.045	1.663	1.131	0.268	0.221	0.251	0.245	0.266	0.211	0.263	0.236	0.208	0.197	0.202	0.202	0.244	0.291	0.242	0.198	0.233	0.540	1.349
215	1.181	1.945	2.105	1.717	1.171	0.273	0.216	0.244	0.239	0.259	0.207	0.257	0.230	0.204	0.194	0.201	0.198	0.238	0.284	0.236	0.196	0.236	0.558	1.394
216	1.183	1.945	2.106	1.719	1.173	0.278	0.218	0.246	0.241	0.261	0.209	0.258	0.232	0.206	0.197	0.205	0.201	0.240	0.286	0.238	0.198	0.240	0.563	1.396
217	1.188	1.947	2.106	1.722	1.177	0.284	0.223	0.250	0.244	0.264	0.214	0.262	0.236	0.211	0.202	0.210	0.206	0.244	0.289	0.241	0.203	0.245	0.569	1.400
218	1.280	2.078	2.242	1.846	1.270	0.301	0.215	0.240	0.235	0.254	0.207	0.251	0.227	0.205	0.202	0.215	0.202	0.234	0.277	0.232	0.202	0.257	0.617	1.505
219	1.251	2.016	2.174	1.792	1.240	0.313	0.237	0.262	0.257	0.275	0.229	0.273	0.249	0.226	0.221	0.233	0.222	0.256	0.299	0.254	0.222	0.272	0.613	1.467

220	1.263	2.032	2.190	1.807	1.252	0.317	0.237	0.262	0.257	0.275	0.229	0.273	0.249	0.227	0.223	0.235	0.223	0.256	0.298	0.254	0.223	0.275	0.620	1.480
221	0.688	1.093	1.190	0.959	0.673	0.338	0.414	0.448	0.442	0.463	0.401	0.461	0.432	0.396	0.370	0.351	0.385	0.440	0.487	0.438	0.373	0.338	0.418	0.794
222	0.701	1.109	1.207	0.975	0.685	0.343	0.414	0.448	0.442	0.463	0.401	0.461	0.432	0.396	0.371	0.354	0.386	0.440	0.486	0.438	0.374	0.341	0.427	0.808
223	0.725	1.144	1.243	1.006	0.709	0.346	0.411	0.444	0.438	0.459	0.399	0.457	0.429	0.394	0.370	0.353	0.384	0.437	0.483	0.434	0.373	0.343	0.438	0.836
224	0.733	1.150	1.248	1.015	0.717	0.355	0.417	0.449	0.443	0.463	0.405	0.461	0.434	0.400	0.377	0.361	0.390	0.441	0.486	0.439	0.379	0.351	0.448	0.844
225	0.745	1.171	1.271	1.033	0.729	0.352	0.410	0.442	0.437	0.457	0.398	0.455	0.427	0.394	0.371	0.356	0.384	0.435	0.480	0.433	0.374	0.347	0.450	0.858
226	0.739	1.151	1.248	1.018	0.722	0.364	0.423	0.454	0.449	0.469	0.411	0.467	0.440	0.407	0.385	0.370	0.397	0.447	0.492	0.445	0.387	0.361	0.457	0.848
227	0.757	1.180	1.278	1.044	0.741	0.363	0.418	0.449	0.444	0.464	0.406	0.462	0.435	0.402	0.381	0.366	0.393	0.442	0.487	0.440	0.382	0.358	0.463	0.870
228	0.757	1.173	1.270	1.039	0.741	0.371	0.426	0.457	0.451	0.471	0.415	0.469	0.442	0.410	0.389	0.374	0.401	0.450	0.494	0.447	0.391	0.367	0.468	0.868
229	0.793	1.234	1.335	1.093	0.775	0.365	0.411	0.442	0.436	0.456	0.400	0.454	0.427	0.396	0.375	0.362	0.387	0.435	0.479	0.432	0.377	0.357	0.478	0.911
230	0.793	1.230	1.330	1.091	0.776	0.372	0.416	0.446	0.440	0.460	0.405	0.458	0.432	0.401	0.382	0.369	0.392	0.439	0.482	0.437	0.383	0.365	0.483	0.910
231	0.579	0.694	0.729	0.656	0.558	0.587	0.674	0.698	0.694	0.708	0.664	0.706	0.687	0.661	0.641	0.623	0.652	0.692	0.722	0.689	0.640	0.597	0.555	0.603
232	0.590	0.691	0.722	0.659	0.570	0.609	0.692	0.715	0.711	0.725	0.683	0.723	0.705	0.680	0.661	0.644	0.671	0.709	0.738	0.707	0.660	0.619	0.577	0.610
233	0.591	0.712	0.749	0.673	0.570	0.587	0.671	0.695	0.691	0.705	0.662	0.703	0.684	0.658	0.638	0.621	0.649	0.689	0.719	0.686	0.638	0.596	0.560	0.617
234	0.597	0.728	0.767	0.685	0.576	0.578	0.662	0.686	0.682	0.696	0.652	0.694	0.675	0.649	0.629	0.611	0.640	0.680	0.711	0.677	0.628	0.587	0.555	0.625
235	0.607	0.729	0.765	0.690	0.586	0.594	0.675	0.698	0.694	0.708	0.665	0.706	0.687	0.662	0.643	0.626	0.653	0.692	0.722	0.689	0.642	0.603	0.571	0.633
236	0.616	0.744	0.781	0.704	0.594	0.593	0.671	0.694	0.690	0.704	0.662	0.702	0.683	0.658	0.640	0.624	0.650	0.688	0.718	0.685	0.639	0.601	0.575	0.644
237	0.631	0.771	0.810	0.728	0.609	0.589	0.662	0.685	0.681	0.695	0.653	0.693	0.675	0.650	0.632	0.617	0.642	0.679	0.710	0.677	0.631	0.595	0.578	0.662
238	0.651	0.781	0.818	0.743	0.629	0.612	0.678	0.700	0.696	0.709	0.670	0.707	0.690	0.667	0.650	0.636	0.659	0.694	0.722	0.691	0.648	0.617	0.604	0.680
239	0.648	0.799	0.840	0.753	0.626	0.589	0.657	0.679	0.676	0.689	0.648	0.687	0.669	0.645	0.627	0.613	0.637	0.673	0.703	0.671	0.626	0.593	0.585	0.683
240	0.656	0.794	0.832	0.754	0.633	0.606	0.671	0.693	0.689	0.703	0.663	0.701	0.683	0.660	0.644	0.630	0.652	0.687	0.716	0.685	0.642	0.611	0.601	0.687

Table 17: Fitness values of all DGs at each scenario (BRO)

Fitness value (BRO)																								
DGs	***S 1***	***S 2***	***S 3***	***S 4***	***S 5***	***S 6***	***S 7***	***S 8***	***S 9***	***S 10***	***S 11***	***S 12***	***S 13***	***S 14***	***S 15***	***S 16***	***S 17***	***S 18***	***S 19***	***S 20***	***S 21***	***S 22***	***S 23***	***S 24***
1	0.076	0.176	0.131	0.122	0.062	0.301	0.513	0.562	0.545	0.580	0.493	0.568	0.542	0.489	0.445	0.400	0.459	0.551	0.605	0.547	0.442	0.337	0.149	0.059
2	0.080	0.192	0.150	0.134	0.065	0.292	0.501	0.551	0.534	0.569	0.482	0.558	0.531	0.478	0.433	0.390	0.447	0.540	0.595	0.535	0.431	0.328	0.144	0.065
3	0.085	0.187	0.142	0.133	0.070	0.304	0.513	0.561	0.545	0.580	0.493	0.568	0.542	0.489	0.445	0.401	0.459	0.551	0.605	0.546	0.443	0.340	0.155	0.063
4	0.096	0.211	0.168	0.153	0.081	0.300	0.504	0.553	0.536	0.572	0.485	0.560	0.533	0.481	0.437	0.395	0.451	0.543	0.597	0.538	0.435	0.334	0.157	0.071
5	0.106	0.223	0.180	0.164	0.091	0.302	0.505	0.554	0.537	0.572	0.486	0.560	0.534	0.482	0.439	0.396	0.452	0.543	0.598	0.539	0.437	0.336	0.162	0.082
6	0.117	0.223	0.177	0.170	0.101	0.321	0.519	0.566	0.550	0.584	0.500	0.573	0.547	0.497	0.455	0.414	0.467	0.556	0.609	0.552	0.452	0.354	0.181	0.090
7	0.129	0.258	0.218	0.198	0.113	0.305	0.500	0.548	0.532	0.567	0.482	0.555	0.529	0.478	0.436	0.395	0.448	0.538	0.592	0.533	0.433	0.337	0.175	0.109
8	0.142	0.255	0.211	0.201	0.124	0.329	0.519	0.566	0.550	0.584	0.501	0.572	0.547	0.498	0.457	0.417	0.468	0.556	0.608	0.551	0.453	0.360	0.197	0.115
9	0.167	0.299	0.258	0.236	0.151	0.319	0.508	0.555	0.539	0.573	0.490	0.561	0.536	0.487	0.446	0.405	0.458	0.545	0.598	0.541	0.443	0.350	0.198	0.145
10	0.195	0.337	0.296	0.276	0.176	0.330	0.508	0.553	0.537	0.570	0.490	0.558	0.534	0.487	0.449	0.412	0.459	0.543	0.594	0.538	0.445	0.358	0.218	0.171
11	0.144	0.053	0.047	0.069	0.129	0.547	0.728	0.765	0.750	0.778	0.714	0.766	0.750	0.712	0.678	0.642	0.686	0.756	0.794	0.753	0.673	0.582	0.360	0.053
12	0.149	0.060	0.051	0.076	0.135	0.549	0.728	0.765	0.750	0.777	0.714	0.766	0.750	0.712	0.679	0.642	0.686	0.756	0.794	0.753	0.674	0.583	0.363	0.058
13	0.156	0.064	0.052	0.082	0.140	0.555	0.732	0.768	0.754	0.781	0.719	0.770	0.754	0.717	0.684	0.648	0.690	0.760	0.797	0.756	0.678	0.589	0.371	0.064
14	0.178	0.070	0.052	0.095	0.163	0.586	0.756	0.790	0.776	0.802	0.743	0.791	0.777	0.742	0.710	0.676	0.716	0.782	0.816	0.778	0.704	0.619	0.402	0.084
15	0.158	0.072	0.055	0.088	0.142	0.550	0.727	0.763	0.749	0.776	0.713	0.764	0.749	0.711	0.678	0.642	0.685	0.755	0.792	0.751	0.673	0.583	0.368	0.069
16	0.161	0.081	0.064	0.095	0.145	0.545	0.722	0.758	0.743	0.770	0.708	0.759	0.744	0.706	0.672	0.637	0.679	0.749	0.787	0.746	0.667	0.578	0.366	0.072
17	0.165	0.091	0.061	0.103	0.149	0.541	0.717	0.753	0.739	0.766	0.703	0.755	0.739	0.701	0.668	0.632	0.675	0.745	0.783	0.741	0.663	0.574	0.363	0.080
18	0.175	0.102	0.062	0.114	0.158	0.547	0.721	0.756	0.742	0.769	0.707	0.758	0.742	0.705	0.672	0.637	0.679	0.748	0.785	0.744	0.667	0.580	0.372	0.094
19	0.192	0.130	0.078	0.139	0.175	0.542	0.712	0.748	0.733	0.760	0.698	0.749	0.734	0.696	0.664	0.629	0.670	0.739	0.776	0.736	0.658	0.573	0.375	0.109
20	0.169	0.156	0.113	0.145	0.152	0.475	0.655	0.694	0.679	0.708	0.639	0.697	0.678	0.637	0.601	0.564	0.610	0.685	0.727	0.681	0.597	0.507	0.316	0.099
21	0.305	0.134	0.038	0.186	0.289	0.712	0.849	0.875	0.862	0.883	0.839	0.873	0.865	0.839	0.815	0.788	0.816	0.868	0.893	0.865	0.808	0.739	0.543	0.195
22	0.315	0.146	0.048	0.198	0.299	0.716	0.850	0.876	0.863	0.884	0.840	0.874	0.866	0.840	0.817	0.791	0.817	0.869	0.894	0.866	0.810	0.743	0.550	0.206
23	0.349	0.174	0.071	0.229	0.332	0.742	0.866	0.890	0.878	0.898	0.857	0.887	0.881	0.858	0.836	0.812	0.836	0.884	0.907	0.881	0.829	0.766	0.582	0.238
24	0.361	0.183	0.077	0.240	0.343	0.752	0.873	0.896	0.884	0.904	0.864	0.893	0.888	0.865	0.845	0.821	0.843	0.890	0.912	0.887	0.837	0.776	0.595	0.250
25	0.365	0.195	0.085	0.251	0.348	0.748	0.867	0.890	0.878	0.898	0.859	0.887	0.882	0.859	0.839	0.815	0.837	0.884	0.906	0.881	0.831	0.771	0.593	0.257
26	0.367	0.210	0.098	0.261	0.349	0.736	0.853	0.877	0.865	0.885	0.845	0.875	0.868	0.845	0.825	0.802	0.823	0.871	0.894	0.868	0.817	0.758	0.586	0.262

27	0.371	0.231	0.122	0.276	0.353	0.720	0.839	0.863	0.851	0.872	0.830	0.861	0.854	0.830	0.809	0.785	0.808	0.857	0.881	0.854	0.802	0.742	0.575	0.271
28	0.395	0.244	0.133	0.295	0.377	0.745	0.856	0.879	0.867	0.887	0.848	0.876	0.871	0.849	0.829	0.807	0.827	0.873	0.895	0.870	0.821	0.766	0.604	0.292
29	0.409	0.260	0.149	0.311	0.390	0.750	0.858	0.880	0.868	0.888	0.850	0.877	0.872	0.851	0.832	0.811	0.829	0.874	0.896	0.872	0.824	0.770	0.612	0.306
30	0.439	0.289	0.175	0.342	0.419	0.770	0.869	0.890	0.878	0.897	0.862	0.886	0.882	0.863	0.846	0.827	0.842	0.884	0.904	0.881	0.837	0.788	0.639	0.337
31	0.132	0.074	0.035	0.075	0.119	0.501	0.690	0.729	0.714	0.743	0.674	0.732	0.713	0.672	0.635	0.596	0.644	0.720	0.762	0.717	0.632	0.537	0.319	0.070
32	0.140	0.079	0.028	0.081	0.127	0.508	0.695	0.734	0.719	0.748	0.680	0.737	0.718	0.678	0.641	0.603	0.650	0.725	0.766	0.722	0.638	0.544	0.327	0.073
33	0.141	0.086	0.029	0.085	0.128	0.502	0.690	0.728	0.714	0.743	0.674	0.731	0.713	0.672	0.635	0.597	0.645	0.720	0.761	0.716	0.632	0.538	0.323	0.075
34	0.141	0.090	0.032	0.087	0.129	0.499	0.686	0.725	0.710	0.740	0.671	0.728	0.710	0.668	0.632	0.593	0.641	0.717	0.758	0.713	0.629	0.535	0.320	0.077
35	0.142	0.090	0.035	0.088	0.129	0.500	0.687	0.726	0.711	0.740	0.672	0.729	0.711	0.669	0.633	0.594	0.642	0.718	0.759	0.714	0.629	0.536	0.322	0.077
36	0.147	0.093	0.040	0.092	0.134	0.505	0.691	0.730	0.715	0.744	0.676	0.732	0.714	0.673	0.637	0.599	0.646	0.721	0.762	0.718	0.634	0.541	0.328	0.079
37	0.151	0.106	0.039	0.102	0.138	0.497	0.683	0.722	0.707	0.736	0.668	0.725	0.707	0.665	0.629	0.591	0.638	0.714	0.755	0.710	0.626	0.533	0.323	0.087
38	0.169	0.120	0.051	0.119	0.156	0.513	0.693	0.731	0.716	0.745	0.678	0.734	0.716	0.676	0.641	0.604	0.649	0.723	0.763	0.719	0.637	0.547	0.341	0.102
39	0.193	0.146	0.076	0.145	0.179	0.524	0.699	0.736	0.721	0.749	0.684	0.738	0.721	0.682	0.648	0.612	0.655	0.727	0.767	0.724	0.644	0.557	0.358	0.126
40	0.218	0.172	0.099	0.171	0.203	0.536	0.704	0.740	0.726	0.753	0.690	0.742	0.726	0.688	0.655	0.620	0.662	0.732	0.770	0.729	0.651	0.567	0.376	0.146
41	0.100	0.183	0.133	0.135	0.088	0.333	0.537	0.584	0.567	0.602	0.518	0.590	0.565	0.514	0.471	0.429	0.484	0.574	0.626	0.569	0.469	0.368	0.182	0.077
42	0.101	0.185	0.136	0.137	0.089	0.332	0.535	0.582	0.566	0.600	0.517	0.589	0.563	0.513	0.470	0.428	0.483	0.572	0.624	0.568	0.468	0.367	0.182	0.078
43	0.105	0.205	0.159	0.151	0.094	0.318	0.521	0.569	0.553	0.587	0.503	0.576	0.550	0.499	0.455	0.413	0.469	0.559	0.612	0.555	0.453	0.352	0.173	0.084
44	0.114	0.195	0.144	0.149	0.102	0.343	0.543	0.589	0.573	0.607	0.525	0.595	0.570	0.521	0.479	0.437	0.491	0.579	0.630	0.575	0.476	0.377	0.196	0.088
45	0.120	0.199	0.148	0.154	0.107	0.348	0.546	0.592	0.576	0.609	0.528	0.598	0.573	0.524	0.483	0.441	0.495	0.582	0.633	0.578	0.480	0.382	0.201	0.093
46	0.126	0.223	0.176	0.172	0.112	0.332	0.529	0.576	0.559	0.593	0.510	0.582	0.557	0.507	0.465	0.424	0.477	0.565	0.617	0.561	0.462	0.365	0.192	0.101
47	0.128	0.211	0.160	0.165	0.114	0.349	0.545	0.591	0.575	0.608	0.527	0.597	0.572	0.524	0.482	0.441	0.494	0.581	0.632	0.577	0.479	0.383	0.205	0.099
48	0.141	0.218	0.165	0.175	0.126	0.362	0.554	0.599	0.583	0.615	0.536	0.604	0.580	0.533	0.492	0.452	0.504	0.589	0.638	0.584	0.489	0.394	0.220	0.105
49	0.168	0.269	0.226	0.219	0.152	0.353	0.539	0.584	0.568	0.601	0.521	0.590	0.566	0.518	0.478	0.439	0.489	0.574	0.625	0.570	0.475	0.383	0.225	0.145
50	0.179	0.291	0.244	0.237	0.162	0.347	0.532	0.577	0.561	0.594	0.514	0.582	0.558	0.511	0.471	0.432	0.482	0.567	0.617	0.563	0.468	0.377	0.225	0.158
51	0.500	1.105	1.158	0.899	0.493	0.028	0.144	0.199	0.180	0.222	0.123	0.209	0.175	0.119	0.079	0.050	0.090	0.188	0.256	0.183	0.079	0.029	0.116	0.608
52	0.501	1.106	1.159	0.900	0.494	0.030	0.145	0.199	0.181	0.222	0.124	0.210	0.176	0.120	0.080	0.051	0.091	0.188	0.257	0.184	0.080	0.030	0.118	0.609
53	0.491	1.088	1.139	0.884	0.484	0.032	0.149	0.204	0.186	0.227	0.129	0.215	0.181	0.124	0.084	0.055	0.095	0.193	0.262	0.189	0.084	0.034	0.116	0.597
54	0.507	1.108	1.160	0.904	0.499	0.036	0.149	0.204	0.185	0.226	0.129	0.214	0.180	0.124	0.085	0.056	0.096	0.192	0.261	0.188	0.085	0.036	0.124	0.614

55	0.534	1.148	1.202	0.942	0.527	0.039	0.146	0.200	0.181	0.222	0.125	0.210	0.176	0.121	0.083	0.056	0.093	0.189	0.256	0.184	0.083	0.038	0.138	0.646
56	0.605	1.253	1.312	1.039	0.597	0.049	0.136	0.187	0.170	0.209	0.117	0.197	0.165	0.114	0.079	0.056	0.087	0.177	0.243	0.173	0.078	0.043	0.171	0.727
57	0.604	1.245	1.303	1.034	0.596	0.054	0.142	0.193	0.175	0.215	0.123	0.203	0.171	0.120	0.084	0.061	0.092	0.182	0.248	0.178	0.084	0.049	0.175	0.724
58	0.644	1.302	1.361	1.088	0.635	0.064	0.138	0.188	0.170	0.209	0.121	0.197	0.167	0.118	0.086	0.065	0.092	0.177	0.242	0.173	0.084	0.056	0.197	0.769
59	0.656	1.312	1.371	1.099	0.647	0.069	0.143	0.192	0.175	0.214	0.125	0.202	0.171	0.122	0.090	0.069	0.097	0.182	0.246	0.178	0.089	0.061	0.205	0.781
60	0.647	1.291	1.347	1.081	0.637	0.076	0.151	0.201	0.183	0.222	0.134	0.210	0.180	0.131	0.098	0.078	0.105	0.190	0.254	0.186	0.097	0.068	0.206	0.768
61	1.826	3.007	3.140	2.689	1.832	0.251	0.011	0.021	0.010	0.031	0.013	0.021	0.015	0.019	0.042	0.085	0.014	0.017	0.053	0.016	0.034	0.169	0.782	2.116
62	1.916	3.118	3.253	2.799	1.921	0.281	0.018	0.025	0.014	0.034	0.022	0.024	0.021	0.029	0.056	0.102	0.025	0.022	0.054	0.022	0.047	0.194	0.838	2.213
63	1.844	3.022	3.153	2.707	1.847	0.265	0.020	0.029	0.017	0.038	0.023	0.028	0.023	0.029	0.053	0.097	0.024	0.025	0.059	0.024	0.044	0.183	0.799	2.133
64	1.870	3.055	3.187	2.739	1.874	0.273	0.021	0.030	0.019	0.039	0.025	0.029	0.024	0.031	0.056	0.101	0.026	0.026	0.059	0.025	0.047	0.189	0.815	2.162
65	1.950	3.156	3.290	2.837	1.953	0.298	0.026	0.032	0.021	0.040	0.031	0.030	0.028	0.038	0.066	0.115	0.034	0.030	0.059	0.029	0.057	0.209	0.863	2.249
66	1.863	3.036	3.166	2.724	1.866	0.280	0.030	0.038	0.027	0.047	0.033	0.037	0.034	0.040	0.065	0.109	0.035	0.035	0.068	0.034	0.055	0.197	0.817	2.152
67	1.949	3.146	3.278	2.830	1.952	0.307	0.035	0.040	0.029	0.047	0.040	0.037	0.036	0.047	0.076	0.124	0.043	0.037	0.065	0.037	0.066	0.218	0.869	2.246
68	1.882	3.054	3.182	2.741	1.884	0.290	0.037	0.045	0.034	0.053	0.040	0.043	0.041	0.046	0.071	0.116	0.041	0.042	0.073	0.042	0.062	0.206	0.831	2.171
69	1.832	2.984	3.110	2.675	1.833	0.280	0.039	0.049	0.038	0.058	0.042	0.048	0.044	0.047	0.070	0.113	0.041	0.046	0.078	0.045	0.061	0.198	0.804	2.115
70	2.153	3.404	3.541	3.082	2.156	0.370	0.047	0.046	0.036	0.051	0.055	0.041	0.045	0.064	0.101	0.159	0.062	0.045	0.067	0.045	0.090	0.269	0.994	2.469
71	2.308	3.646	3.797	3.305	2.319	0.377	0.016	0.009	0.006	0.012	0.027	0.005	0.012	0.036	0.079	0.145	0.037	0.010	0.026	0.010	0.067	0.266	1.059	2.650
72	2.290	3.623	3.774	3.283	2.300	0.373	0.017	0.010	0.006	0.012	0.026	0.005	0.012	0.036	0.078	0.143	0.036	0.010	0.027	0.011	0.066	0.263	1.050	2.630
73	2.332	3.676	3.827	3.334	2.343	0.386	0.019	0.011	0.007	0.014	0.030	0.007	0.014	0.039	0.083	0.150	0.041	0.012	0.027	0.012	0.072	0.274	1.075	2.676
74	2.355	3.705	3.856	3.362	2.365	0.395	0.022	0.013	0.007	0.015	0.033	0.008	0.016	0.042	0.088	0.156	0.044	0.014	0.028	0.014	0.076	0.281	1.090	2.702
75	2.286	3.613	3.762	3.275	2.294	0.377	0.021	0.015	0.009	0.018	0.031	0.010	0.017	0.040	0.083	0.148	0.041	0.015	0.031	0.015	0.071	0.267	1.051	2.625
76	2.247	3.563	3.711	3.226	2.255	0.368	0.022	0.017	0.010	0.019	0.031	0.012	0.018	0.040	0.081	0.144	0.040	0.016	0.032	0.016	0.069	0.260	1.030	2.582
77	2.406	3.769	3.922	3.427	2.414	0.415	0.029	0.018	0.012	0.019	0.041	0.011	0.022	0.051	0.098	0.169	0.053	0.019	0.027	0.020	0.085	0.297	1.126	2.756
78	2.422	3.788	3.941	3.445	2.431	0.420	0.030	0.019	0.012	0.020	0.042	0.011	0.023	0.052	0.101	0.172	0.055	0.020	0.028	0.021	0.088	0.302	1.135	2.774
79	2.503	3.886	4.039	3.542	2.512	0.453	0.042	0.029	0.022	0.029	0.055	0.020	0.034	0.066	0.117	0.193	0.069	0.030	0.035	0.031	0.104	0.329	1.190	2.861
80	2.476	3.851	4.004	3.510	2.483	0.450	0.044	0.032	0.025	0.031	0.057	0.022	0.037	0.068	0.118	0.194	0.071	0.033	0.037	0.034	0.104	0.327	1.178	2.830
81	2.214	3.522	3.669	3.185	2.224	0.353	0.016	0.012	0.008	0.016	0.025	0.009	0.013	0.033	0.072	0.133	0.033	0.012	0.031	0.012	0.061	0.248	1.006	2.546
82	2.208	3.512	3.659	3.176	2.218	0.353	0.017	0.013	0.009	0.018	0.025	0.010	0.014	0.034	0.073	0.134	0.034	0.013	0.033	0.013	0.062	0.248	1.003	2.539

83	2.312	3.646	3.796	3.306	2.324	0.384	0.022	0.014	0.010	0.018	0.032	0.010	0.017	0.041	0.085	0.151	0.043	0.015	0.032	0.015	0.073	0.273	1.065	2.654
84	2.286	3.607	3.755	3.269	2.297	0.381	0.025	0.019	0.015	0.023	0.035	0.014	0.021	0.044	0.086	0.151	0.045	0.019	0.037	0.020	0.075	0.272	1.053	2.624
85	2.339	3.675	3.824	3.335	2.350	0.396	0.027	0.020	0.015	0.023	0.038	0.014	0.022	0.047	0.092	0.160	0.049	0.020	0.036	0.021	0.081	0.284	1.085	2.682
86	2.350	3.688	3.836	3.348	2.362	0.402	0.030	0.022	0.018	0.025	0.041	0.017	0.025	0.051	0.096	0.164	0.053	0.022	0.038	0.023	0.084	0.289	1.093	2.694
87	2.336	3.668	3.817	3.330	2.346	0.402	0.032	0.025	0.019	0.028	0.043	0.019	0.027	0.053	0.097	0.165	0.054	0.025	0.038	0.026	0.085	0.289	1.088	2.677
88	2.478	3.847	3.998	3.504	2.488	0.446	0.042	0.029	0.024	0.031	0.055	0.022	0.033	0.065	0.116	0.191	0.069	0.030	0.041	0.031	0.103	0.326	1.174	2.832
89	2.605	4.010	4.164	3.664	2.616	0.488	0.050	0.034	0.029	0.034	0.065	0.026	0.040	0.077	0.133	0.214	0.082	0.035	0.040	0.037	0.119	0.359	1.254	2.971
90	2.492	3.855	4.004	3.514	2.502	0.459	0.050	0.037	0.031	0.039	0.063	0.031	0.041	0.074	0.125	0.201	0.078	0.038	0.049	0.039	0.113	0.337	1.188	2.846
91	2.606	4.037	4.198	3.683	2.619	0.464	0.027	0.011	0.006	0.008	0.041	0.005	0.017	0.053	0.108	0.189	0.058	0.013	0.013	0.014	0.095	0.334	1.237	2.979
92	2.603	4.031	4.191	3.677	2.615	0.463	0.028	0.011	0.006	0.009	0.042	0.005	0.018	0.053	0.109	0.189	0.059	0.013	0.015	0.015	0.095	0.333	1.236	2.975
93	2.712	4.171	4.334	3.814	2.725	0.497	0.033	0.014	0.008	0.010	0.050	0.006	0.021	0.062	0.122	0.208	0.069	0.017	0.013	0.018	0.108	0.360	1.302	3.095
94	2.582	3.994	4.150	3.644	2.593	0.466	0.035	0.020	0.013	0.017	0.050	0.012	0.026	0.061	0.116	0.196	0.066	0.022	0.024	0.023	0.103	0.338	1.230	2.950
95	2.672	4.094	4.250	3.746	2.683	0.507	0.056	0.037	0.031	0.033	0.071	0.028	0.044	0.083	0.141	0.225	0.089	0.039	0.037	0.041	0.128	0.374	1.294	3.044
96	2.556	3.945	4.098	3.602	2.566	0.475	0.052	0.037	0.030	0.035	0.066	0.028	0.043	0.077	0.131	0.209	0.082	0.039	0.041	0.040	0.117	0.349	1.226	2.917
97	2.673	4.090	4.244	3.744	2.683	0.516	0.063	0.044	0.038	0.040	0.079	0.033	0.051	0.091	0.149	0.234	0.097	0.046	0.043	0.048	0.135	0.383	1.301	3.044
98	2.529	3.923	4.078	3.577	2.538	0.455	0.037	0.023	0.016	0.022	0.051	0.014	0.028	0.062	0.115	0.193	0.067	0.025	0.029	0.026	0.102	0.331	1.201	2.890
99	2.652	4.080	4.238	3.731	2.662	0.495	0.045	0.027	0.020	0.024	0.061	0.017	0.034	0.073	0.131	0.215	0.079	0.029	0.029	0.030	0.116	0.362	1.277	3.025
100	2.642	4.064	4.221	3.715	2.651	0.494	0.047	0.029	0.022	0.026	0.062	0.019	0.036	0.074	0.132	0.215	0.080	0.031	0.030	0.032	0.117	0.362	1.271	3.013
101	1.563	2.653	2.776	2.350	1.567	0.187	0.012	0.031	0.017	0.045	0.012	0.034	0.021	0.015	0.028	0.057	0.010	0.025	0.071	0.024	0.020	0.122	0.634	1.823
102	1.538	2.617	2.738	2.316	1.541	0.183	0.014	0.035	0.021	0.050	0.013	0.039	0.024	0.017	0.028	0.056	0.011	0.029	0.076	0.027	0.021	0.119	0.622	1.795
103	1.569	2.657	2.779	2.356	1.572	0.193	0.016	0.036	0.022	0.049	0.016	0.038	0.025	0.019	0.032	0.062	0.012	0.030	0.075	0.028	0.025	0.127	0.641	1.829
104	1.637	2.747	2.872	2.443	1.638	0.212	0.019	0.034	0.022	0.046	0.019	0.035	0.026	0.023	0.039	0.072	0.019	0.030	0.068	0.028	0.031	0.142	0.681	1.903
105	1.722	2.856	2.983	2.548	1.724	0.237	0.023	0.036	0.024	0.046	0.024	0.036	0.029	0.029	0.048	0.086	0.025	0.032	0.067	0.031	0.040	0.162	0.732	1.997
106	1.724	2.856	2.982	2.549	1.726	0.241	0.026	0.038	0.026	0.048	0.028	0.038	0.032	0.033	0.052	0.089	0.029	0.034	0.069	0.033	0.044	0.166	0.735	1.998
107	1.831	2.993	3.122	2.684	1.832	0.278	0.035	0.043	0.031	0.051	0.039	0.041	0.038	0.045	0.069	0.112	0.040	0.039	0.068	0.038	0.059	0.196	0.804	2.116
108	1.710	2.785	2.899	2.495	1.708	0.286	0.073	0.084	0.072	0.093	0.075	0.083	0.078	0.080	0.100	0.137	0.074	0.080	0.113	0.079	0.091	0.212	0.762	1.969
109	1.703	2.721	2.821	2.449	1.698	0.337	0.124	0.134	0.122	0.143	0.126	0.133	0.129	0.132	0.153	0.190	0.126	0.131	0.161	0.130	0.144	0.265	0.797	1.947
110	1.848	2.958	3.074	2.662	1.848	0.329	0.081	0.088	0.076	0.097	0.086	0.087	0.083	0.092	0.118	0.162	0.088	0.085	0.116	0.084	0.109	0.248	0.846	2.121

111	2.623	4.054	4.214	3.700	2.636	0.472	0.031	0.014	0.011	0.011	0.045	0.009	0.020	0.057	0.113	0.195	0.063	0.016	0.017	0.017	0.100	0.341	1.249	2.996
112	2.644	4.080	4.240	3.726	2.657	0.480	0.033	0.016	0.012	0.013	0.049	0.009	0.023	0.060	0.118	0.201	0.066	0.018	0.019	0.019	0.104	0.348	1.263	3.019
113	2.608	4.030	4.189	3.679	2.620	0.472	0.035	0.018	0.014	0.016	0.049	0.010	0.024	0.060	0.116	0.197	0.066	0.020	0.022	0.021	0.103	0.342	1.244	2.979
114	2.653	4.090	4.249	3.736	2.666	0.485	0.036	0.017	0.013	0.015	0.051	0.010	0.024	0.063	0.120	0.204	0.069	0.020	0.021	0.021	0.107	0.352	1.270	3.029
115	2.721	4.173	4.334	3.818	2.735	0.509	0.042	0.022	0.016	0.019	0.059	0.011	0.030	0.071	0.132	0.219	0.078	0.025	0.024	0.026	0.117	0.372	1.313	3.103
116	2.687	4.126	4.285	3.772	2.700	0.499	0.041	0.022	0.017	0.020	0.057	0.012	0.029	0.069	0.129	0.214	0.076	0.025	0.027	0.026	0.115	0.365	1.293	3.064
117	2.694	4.134	4.292	3.781	2.707	0.503	0.044	0.024	0.018	0.022	0.060	0.014	0.032	0.072	0.132	0.218	0.079	0.027	0.028	0.029	0.118	0.369	1.299	3.072
118	2.693	4.128	4.286	3.776	2.706	0.504	0.045	0.026	0.019	0.024	0.061	0.015	0.033	0.073	0.133	0.218	0.080	0.028	0.032	0.030	0.119	0.370	1.298	3.070
119	2.794	4.258	4.418	3.902	2.807	0.536	0.051	0.028	0.022	0.025	0.069	0.017	0.037	0.081	0.145	0.236	0.090	0.031	0.031	0.033	0.131	0.396	1.360	3.181
120	2.729	4.167	4.324	3.816	2.742	0.522	0.053	0.034	0.027	0.031	0.070	0.023	0.041	0.082	0.143	0.231	0.090	0.036	0.039	0.038	0.130	0.386	1.325	3.108
121	2.112	3.387	3.531	3.055	2.121	0.326	0.013	0.014	0.005	0.020	0.020	0.011	0.012	0.028	0.063	0.120	0.027	0.012	0.038	0.012	0.053	0.227	0.946	2.434
122	2.135	3.416	3.560	3.083	2.144	0.333	0.015	0.014	0.006	0.020	0.022	0.011	0.013	0.031	0.067	0.124	0.029	0.013	0.038	0.013	0.056	0.233	0.960	2.459
123	2.139	3.416	3.560	3.085	2.146	0.339	0.020	0.019	0.011	0.025	0.028	0.016	0.018	0.036	0.072	0.130	0.034	0.017	0.041	0.017	0.061	0.238	0.967	2.461
124	2.166	3.449	3.593	3.118	2.174	0.351	0.023	0.022	0.013	0.028	0.032	0.019	0.021	0.040	0.078	0.137	0.039	0.020	0.045	0.020	0.067	0.248	0.985	2.491
125	2.163	3.444	3.588	3.115	2.170	0.352	0.026	0.023	0.015	0.028	0.034	0.019	0.023	0.043	0.080	0.139	0.042	0.022	0.043	0.022	0.069	0.250	0.986	2.487
126	2.126	3.391	3.531	3.063	2.133	0.345	0.028	0.029	0.019	0.035	0.036	0.026	0.028	0.044	0.080	0.137	0.042	0.028	0.051	0.027	0.069	0.245	0.966	2.445
127	2.122	3.383	3.523	3.057	2.128	0.348	0.033	0.034	0.024	0.039	0.040	0.029	0.032	0.048	0.083	0.140	0.046	0.032	0.054	0.032	0.072	0.248	0.967	2.440
128	2.165	3.438	3.579	3.110	2.171	0.360	0.034	0.034	0.024	0.040	0.042	0.030	0.033	0.050	0.087	0.146	0.049	0.033	0.054	0.033	0.076	0.257	0.992	2.487
129	2.248	3.545	3.688	3.214	2.253	0.386	0.039	0.036	0.027	0.040	0.048	0.030	0.037	0.057	0.097	0.161	0.057	0.035	0.051	0.035	0.086	0.278	1.043	2.578
130	2.230	3.519	3.662	3.191	2.235	0.385	0.042	0.040	0.030	0.044	0.051	0.034	0.040	0.060	0.099	0.162	0.059	0.039	0.055	0.039	0.088	0.278	1.036	2.557
131	1.507	2.575	2.694	2.275	1.511	0.173	0.013	0.038	0.023	0.053	0.011	0.042	0.026	0.014	0.024	0.050	0.009	0.032	0.080	0.030	0.017	0.112	0.603	1.760
132	1.543	2.617	2.736	2.317	1.547	0.189	0.020	0.042	0.028	0.057	0.018	0.046	0.031	0.022	0.033	0.061	0.016	0.036	0.083	0.034	0.026	0.125	0.628	1.799
133	1.569	2.652	2.773	2.351	1.574	0.195	0.020	0.041	0.027	0.056	0.018	0.045	0.030	0.022	0.034	0.064	0.016	0.035	0.081	0.033	0.027	0.130	0.643	1.827
134	1.618	2.716	2.839	2.413	1.622	0.210	0.021	0.042	0.028	0.055	0.020	0.044	0.032	0.024	0.039	0.071	0.019	0.036	0.080	0.035	0.031	0.141	0.672	1.882
135	1.736	2.877	3.005	2.567	1.741	0.238	0.020	0.035	0.023	0.047	0.021	0.036	0.028	0.026	0.045	0.083	0.022	0.031	0.069	0.030	0.037	0.162	0.738	2.013
136	1.601	2.686	2.806	2.386	1.605	0.211	0.028	0.049	0.035	0.063	0.026	0.052	0.039	0.030	0.043	0.075	0.023	0.044	0.088	0.042	0.036	0.143	0.666	1.861
137	1.677	2.785	2.907	2.482	1.681	0.235	0.033	0.049	0.036	0.060	0.033	0.050	0.041	0.038	0.054	0.089	0.031	0.044	0.084	0.043	0.046	0.163	0.713	1.945
138	1.798	2.941	3.067	2.634	1.802	0.271	0.040	0.052	0.040	0.061	0.042	0.051	0.046	0.047	0.069	0.109	0.042	0.048	0.081	0.047	0.060	0.192	0.787	2.077

139	1.870	3.032	3.160	2.723	1.874	0.295	0.043	0.052	0.040	0.061	0.046	0.051	0.047	0.053	0.078	0.123	0.049	0.048	0.080	0.047	0.069	0.211	0.830	2.156
140	1.772	2.891	3.012	2.590	1.776	0.278	0.052	0.067	0.054	0.077	0.054	0.067	0.059	0.060	0.081	0.120	0.054	0.062	0.097	0.061	0.072	0.200	0.782	2.044
141	1.123	2.042	2.142	1.768	1.125	0.091	0.035	0.077	0.060	0.096	0.022	0.085	0.058	0.022	0.012	0.020	0.007	0.068	0.128	0.065	0.009	0.053	0.397	1.329
142	1.168	2.105	2.207	1.827	1.170	0.101	0.031	0.072	0.055	0.090	0.020	0.079	0.054	0.020	0.013	0.023	0.008	0.063	0.121	0.060	0.009	0.060	0.420	1.380
143	1.154	2.082	2.183	1.806	1.157	0.099	0.036	0.077	0.061	0.096	0.024	0.085	0.059	0.024	0.014	0.023	0.008	0.069	0.127	0.066	0.011	0.059	0.414	1.363
144	1.198	2.142	2.245	1.864	1.201	0.111	0.035	0.074	0.057	0.092	0.024	0.081	0.056	0.024	0.017	0.029	0.010	0.066	0.123	0.063	0.013	0.068	0.439	1.413
145	1.165	2.091	2.191	1.816	1.166	0.107	0.042	0.082	0.065	0.100	0.030	0.089	0.064	0.030	0.020	0.029	0.012	0.074	0.131	0.071	0.017	0.066	0.424	1.374
146	1.106	2.006	2.102	1.736	1.107	0.099	0.049	0.091	0.074	0.110	0.037	0.098	0.072	0.036	0.024	0.030	0.017	0.082	0.141	0.079	0.020	0.062	0.397	1.306
147	1.206	2.136	2.235	1.861	1.208	0.125	0.053	0.090	0.074	0.108	0.042	0.097	0.073	0.042	0.032	0.042	0.024	0.082	0.138	0.080	0.029	0.083	0.453	1.417
148	1.268	2.218	2.319	1.939	1.270	0.140	0.052	0.088	0.073	0.105	0.042	0.095	0.072	0.043	0.035	0.049	0.025	0.081	0.135	0.078	0.032	0.094	0.488	1.486
149	1.222	2.144	2.240	1.872	1.223	0.141	0.064	0.102	0.086	0.119	0.054	0.108	0.085	0.054	0.044	0.056	0.035	0.094	0.149	0.092	0.041	0.097	0.471	1.432
150	1.217	2.136	2.231	1.864	1.217	0.140	0.066	0.104	0.088	0.121	0.055	0.110	0.087	0.055	0.045	0.057	0.037	0.096	0.151	0.093	0.042	0.097	0.468	1.426
151	0.843	1.632	1.714	1.384	0.841	0.053	0.072	0.120	0.103	0.142	0.055	0.130	0.100	0.053	0.028	0.020	0.030	0.111	0.175	0.107	0.027	0.032	0.263	1.007
152	0.896	1.701	1.783	1.450	0.894	0.068	0.074	0.121	0.103	0.141	0.059	0.130	0.100	0.057	0.033	0.028	0.034	0.111	0.174	0.108	0.032	0.044	0.294	1.066
153	0.877	1.672	1.753	1.423	0.875	0.066	0.078	0.124	0.107	0.145	0.062	0.133	0.104	0.060	0.036	0.029	0.037	0.115	0.178	0.111	0.035	0.043	0.286	1.044
154	0.929	1.744	1.828	1.492	0.926	0.076	0.074	0.119	0.102	0.139	0.059	0.128	0.099	0.057	0.035	0.032	0.035	0.110	0.172	0.106	0.034	0.050	0.312	1.103
155	0.997	1.839	1.927	1.581	0.996	0.089	0.068	0.112	0.095	0.131	0.054	0.120	0.092	0.053	0.035	0.035	0.033	0.103	0.163	0.100	0.033	0.058	0.347	1.180
156	0.946	1.762	1.846	1.510	0.943	0.084	0.076	0.121	0.104	0.141	0.062	0.129	0.101	0.061	0.041	0.037	0.039	0.112	0.173	0.108	0.039	0.057	0.324	1.120
157	0.893	1.685	1.765	1.439	0.889	0.079	0.083	0.129	0.112	0.150	0.068	0.138	0.109	0.066	0.045	0.040	0.044	0.120	0.182	0.116	0.043	0.055	0.301	1.060
158	0.955	1.772	1.855	1.521	0.952	0.091	0.079	0.123	0.106	0.142	0.065	0.131	0.103	0.064	0.046	0.043	0.043	0.114	0.174	0.110	0.043	0.063	0.333	1.130
159	1.002	1.832	1.917	1.579	0.998	0.105	0.081	0.122	0.106	0.141	0.067	0.130	0.104	0.067	0.051	0.051	0.047	0.114	0.172	0.111	0.048	0.075	0.361	1.181
160	1.047	1.884	1.969	1.630	1.044	0.122	0.087	0.128	0.111	0.147	0.074	0.135	0.110	0.074	0.060	0.063	0.055	0.120	0.177	0.117	0.058	0.089	0.389	1.230
161	1.415	2.443	2.556	2.150	1.418	0.157	0.021	0.052	0.037	0.069	0.015	0.058	0.037	0.018	0.024	0.046	0.009	0.045	0.097	0.043	0.018	0.101	0.555	1.656
162	1.468	2.512	2.627	2.216	1.471	0.171	0.022	0.051	0.036	0.067	0.017	0.056	0.038	0.020	0.028	0.053	0.012	0.045	0.094	0.043	0.022	0.112	0.585	1.715
163	1.481	2.528	2.644	2.233	1.483	0.177	0.025	0.052	0.037	0.067	0.020	0.056	0.039	0.023	0.032	0.057	0.014	0.046	0.094	0.044	0.025	0.117	0.594	1.729
164	1.479	2.525	2.640	2.230	1.481	0.177	0.026	0.053	0.038	0.068	0.021	0.057	0.040	0.024	0.032	0.057	0.015	0.047	0.095	0.045	0.026	0.117	0.594	1.727
165	1.500	2.552	2.667	2.256	1.502	0.183	0.026	0.053	0.039	0.068	0.022	0.057	0.041	0.025	0.034	0.060	0.015	0.047	0.094	0.045	0.028	0.122	0.606	1.749
166	1.525	2.585	2.702	2.289	1.526	0.191	0.027	0.051	0.037	0.066	0.024	0.055	0.039	0.028	0.038	0.065	0.018	0.045	0.091	0.043	0.031	0.128	0.622	1.777

167	1.559	2.627	2.745	2.331	1.559	0.204	0.031	0.054	0.040	0.067	0.029	0.057	0.043	0.033	0.045	0.074	0.024	0.048	0.091	0.046	0.037	0.139	0.645	1.814
168	1.581	2.652	2.770	2.356	1.581	0.213	0.035	0.056	0.042	0.070	0.033	0.059	0.046	0.037	0.049	0.080	0.027	0.051	0.094	0.049	0.042	0.146	0.660	1.837
169	1.577	2.644	2.761	2.349	1.576	0.216	0.039	0.060	0.046	0.073	0.037	0.062	0.049	0.041	0.054	0.084	0.031	0.054	0.096	0.052	0.046	0.150	0.661	1.832
170	1.666	2.759	2.877	2.460	1.666	0.243	0.043	0.060	0.047	0.072	0.043	0.061	0.051	0.048	0.064	0.099	0.039	0.055	0.095	0.054	0.056	0.171	0.715	1.930
171	2.202	3.504	3.650	3.169	2.210	0.353	0.019	0.015	0.009	0.018	0.027	0.010	0.016	0.036	0.075	0.135	0.036	0.014	0.031	0.015	0.064	0.248	1.002	2.532
172	2.225	3.533	3.680	3.198	2.233	0.362	0.021	0.016	0.011	0.019	0.030	0.011	0.018	0.039	0.079	0.141	0.039	0.016	0.032	0.016	0.067	0.255	1.017	2.557
173	2.291	3.619	3.768	3.280	2.299	0.380	0.023	0.016	0.011	0.018	0.033	0.010	0.018	0.042	0.085	0.150	0.043	0.016	0.029	0.017	0.073	0.270	1.055	2.629
174	2.185	3.477	3.623	3.145	2.192	0.353	0.023	0.020	0.013	0.023	0.031	0.015	0.020	0.039	0.078	0.137	0.039	0.019	0.036	0.019	0.066	0.249	0.995	2.512
175	2.260	3.574	3.721	3.238	2.267	0.376	0.027	0.021	0.015	0.024	0.036	0.016	0.023	0.045	0.086	0.150	0.045	0.021	0.035	0.021	0.075	0.267	1.040	2.595
176	2.388	3.739	3.890	3.400	2.396	0.415	0.033	0.023	0.016	0.025	0.044	0.016	0.027	0.054	0.101	0.171	0.056	0.024	0.033	0.024	0.088	0.298	1.118	2.735
177	2.213	3.507	3.651	3.176	2.218	0.371	0.032	0.029	0.021	0.032	0.041	0.023	0.030	0.050	0.090	0.151	0.050	0.028	0.042	0.028	0.078	0.265	1.019	2.541
178	2.199	3.466	3.605	3.143	2.204	0.389	0.056	0.051	0.043	0.054	0.064	0.044	0.052	0.073	0.112	0.173	0.073	0.050	0.064	0.051	0.101	0.285	1.026	2.520
179	2.244	3.523	3.662	3.198	2.248	0.404	0.059	0.053	0.045	0.054	0.069	0.046	0.055	0.078	0.119	0.182	0.078	0.053	0.063	0.053	0.107	0.297	1.055	2.568
180	2.278	3.567	3.707	3.241	2.283	0.415	0.061	0.054	0.045	0.055	0.071	0.046	0.056	0.080	0.123	0.188	0.081	0.054	0.063	0.054	0.111	0.306	1.076	2.606
181	3.096	4.669	4.843	4.299	3.113	0.620	0.056	0.025	0.020	0.017	0.079	0.010	0.037	0.093	0.170	0.277	0.106	0.030	0.011	0.032	0.153	0.459	1.539	3.517
182	3.179	4.772	4.948	4.400	3.195	0.649	0.064	0.030	0.025	0.021	0.088	0.014	0.043	0.103	0.184	0.295	0.117	0.035	0.014	0.037	0.166	0.483	1.592	3.606
183	3.104	4.673	4.846	4.304	3.119	0.627	0.062	0.030	0.025	0.022	0.085	0.016	0.043	0.100	0.177	0.284	0.113	0.035	0.016	0.037	0.160	0.466	1.547	3.523
184	3.147	4.724	4.897	4.355	3.163	0.643	0.068	0.034	0.030	0.025	0.091	0.019	0.048	0.106	0.185	0.294	0.120	0.039	0.019	0.042	0.168	0.480	1.575	3.570
185	3.020	4.562	4.733	4.198	3.033	0.607	0.062	0.033	0.028	0.025	0.084	0.019	0.045	0.098	0.173	0.275	0.110	0.037	0.020	0.039	0.155	0.451	1.500	3.430
186	3.080	4.636	4.808	4.270	3.094	0.625	0.066	0.035	0.030	0.027	0.088	0.021	0.047	0.103	0.180	0.286	0.116	0.039	0.021	0.042	0.163	0.465	1.536	3.496
187	3.138	4.704	4.875	4.338	3.152	0.651	0.077	0.043	0.038	0.034	0.100	0.028	0.056	0.115	0.195	0.304	0.129	0.048	0.027	0.051	0.177	0.488	1.577	3.558
188	3.120	4.680	4.850	4.315	3.133	0.648	0.078	0.044	0.040	0.036	0.101	0.029	0.058	0.116	0.195	0.303	0.130	0.049	0.029	0.052	0.177	0.486	1.568	3.537
189	2.926	4.419	4.582	4.065	2.936	0.599	0.078	0.052	0.046	0.046	0.098	0.039	0.062	0.111	0.182	0.281	0.122	0.056	0.043	0.058	0.165	0.449	1.458	3.321
190	3.002	4.477	4.633	4.132	3.012	0.656	0.115	0.084	0.079	0.077	0.137	0.069	0.097	0.152	0.227	0.329	0.164	0.089	0.072	0.091	0.210	0.503	1.529	3.394
191	2.194	3.496	3.643	3.160	2.204	0.346	0.014	0.011	0.008	0.016	0.022	0.008	0.011	0.031	0.069	0.129	0.030	0.010	0.031	0.010	0.058	0.242	0.993	2.524
192	2.228	3.539	3.687	3.202	2.238	0.357	0.016	0.013	0.008	0.017	0.025	0.009	0.013	0.034	0.074	0.136	0.034	0.012	0.031	0.012	0.063	0.251	1.014	2.561
193	2.309	3.643	3.793	3.303	2.320	0.381	0.020	0.014	0.009	0.017	0.030	0.009	0.015	0.039	0.082	0.148	0.041	0.014	0.030	0.014	0.071	0.270	1.063	2.651
194	2.335	3.676	3.826	3.335	2.344	0.392	0.024	0.017	0.013	0.019	0.035	0.011	0.019	0.044	0.089	0.156	0.046	0.017	0.031	0.018	0.077	0.279	1.081	2.678

195	2.387	3.743	3.894	3.400	2.397	0.408	0.026	0.018	0.013	0.020	0.038	0.012	0.021	0.047	0.094	0.164	0.050	0.018	0.031	0.019	0.082	0.292	1.112	2.736
196	2.292	3.615	3.763	3.277	2.300	0.384	0.027	0.021	0.016	0.023	0.037	0.017	0.023	0.046	0.088	0.154	0.047	0.021	0.035	0.022	0.077	0.274	1.058	2.630
197	2.434	3.799	3.951	3.456	2.444	0.426	0.033	0.024	0.017	0.025	0.045	0.017	0.027	0.055	0.104	0.177	0.058	0.024	0.034	0.025	0.091	0.308	1.143	2.786
198	2.418	3.776	3.928	3.435	2.426	0.425	0.036	0.027	0.019	0.027	0.047	0.019	0.030	0.057	0.106	0.178	0.060	0.027	0.035	0.028	0.093	0.307	1.136	2.767
199	2.407	3.759	3.909	3.420	2.415	0.426	0.038	0.029	0.020	0.029	0.050	0.020	0.031	0.060	0.108	0.180	0.063	0.029	0.038	0.030	0.095	0.309	1.132	2.755
200	2.277	3.583	3.728	3.252	2.283	0.395	0.041	0.036	0.027	0.038	0.050	0.029	0.037	0.059	0.102	0.167	0.060	0.036	0.048	0.036	0.090	0.286	1.060	2.610
201	1.250	2.205	2.309	1.928	1.250	0.134	0.041	0.076	0.061	0.093	0.033	0.082	0.061	0.034	0.032	0.046	0.021	0.069	0.120	0.066	0.026	0.088	0.477	1.467
202	1.317	2.297	2.404	2.016	1.317	0.151	0.039	0.070	0.055	0.086	0.033	0.075	0.056	0.035	0.037	0.054	0.021	0.063	0.113	0.060	0.030	0.101	0.515	1.542
203	1.312	2.286	2.392	2.007	1.311	0.154	0.044	0.076	0.061	0.092	0.038	0.080	0.061	0.040	0.040	0.057	0.026	0.068	0.118	0.066	0.034	0.103	0.516	1.535
204	1.330	2.308	2.414	2.029	1.330	0.159	0.046	0.076	0.061	0.091	0.039	0.080	0.062	0.042	0.043	0.061	0.028	0.069	0.117	0.066	0.036	0.108	0.527	1.555
205	1.371	2.363	2.471	2.081	1.370	0.169	0.045	0.075	0.060	0.090	0.039	0.079	0.061	0.042	0.045	0.065	0.028	0.068	0.115	0.065	0.038	0.115	0.549	1.601
206	1.404	2.406	2.515	2.122	1.404	0.178	0.047	0.075	0.061	0.090	0.042	0.079	0.062	0.044	0.047	0.069	0.031	0.069	0.115	0.066	0.041	0.122	0.568	1.637
207	1.441	2.449	2.557	2.165	1.441	0.193	0.051	0.079	0.065	0.094	0.046	0.083	0.066	0.049	0.055	0.079	0.037	0.073	0.119	0.071	0.049	0.136	0.594	1.677
208	1.361	2.338	2.442	2.060	1.360	0.178	0.059	0.088	0.073	0.103	0.053	0.092	0.075	0.055	0.057	0.076	0.041	0.081	0.128	0.079	0.051	0.125	0.552	1.587
209	1.546	2.580	2.690	2.293	1.548	0.228	0.063	0.086	0.072	0.099	0.061	0.088	0.075	0.064	0.074	0.102	0.053	0.081	0.121	0.079	0.067	0.165	0.658	1.791
210	1.489	2.491	2.596	2.211	1.489	0.225	0.075	0.099	0.085	0.112	0.071	0.102	0.088	0.074	0.081	0.106	0.062	0.093	0.136	0.091	0.074	0.165	0.634	1.724
211	0.629	1.317	1.384	1.091	0.624	0.028	0.104	0.156	0.138	0.179	0.085	0.167	0.134	0.081	0.047	0.026	0.054	0.145	0.213	0.141	0.046	0.020	0.165	0.761
212	0.629	1.315	1.382	1.090	0.624	0.029	0.105	0.158	0.140	0.180	0.087	0.168	0.135	0.083	0.049	0.028	0.056	0.147	0.215	0.143	0.048	0.021	0.166	0.761
213	0.650	1.341	1.409	1.116	0.645	0.036	0.106	0.158	0.140	0.180	0.087	0.168	0.136	0.084	0.051	0.031	0.057	0.147	0.214	0.143	0.050	0.026	0.178	0.784
214	0.638	1.323	1.389	1.099	0.633	0.036	0.109	0.161	0.143	0.184	0.091	0.171	0.139	0.087	0.054	0.033	0.060	0.151	0.218	0.146	0.053	0.027	0.174	0.770
215	0.678	1.380	1.449	1.153	0.673	0.041	0.104	0.155	0.137	0.177	0.086	0.165	0.133	0.083	0.051	0.033	0.057	0.145	0.211	0.141	0.050	0.030	0.192	0.815
216	0.681	1.381	1.450	1.155	0.675	0.046	0.106	0.157	0.139	0.178	0.089	0.166	0.135	0.085	0.054	0.037	0.059	0.146	0.212	0.142	0.052	0.034	0.197	0.817
217	0.685	1.383	1.450	1.158	0.679	0.051	0.111	0.160	0.143	0.182	0.093	0.170	0.139	0.090	0.059	0.042	0.064	0.150	0.215	0.146	0.057	0.039	0.203	0.821
218	0.778	1.514	1.586	1.281	0.771	0.068	0.103	0.151	0.133	0.171	0.087	0.159	0.130	0.084	0.058	0.047	0.061	0.141	0.204	0.137	0.056	0.051	0.251	0.926
219	0.748	1.452	1.518	1.228	0.742	0.080	0.125	0.173	0.155	0.193	0.108	0.181	0.152	0.106	0.078	0.065	0.081	0.163	0.225	0.159	0.076	0.066	0.247	0.888
220	0.761	1.468	1.534	1.243	0.754	0.084	0.125	0.172	0.155	0.193	0.109	0.181	0.152	0.106	0.080	0.067	0.082	0.163	0.225	0.159	0.078	0.069	0.255	0.902
221	0.185	0.529	0.534	0.395	0.174	0.105	0.302	0.359	0.340	0.381	0.280	0.369	0.335	0.275	0.227	0.183	0.243	0.347	0.413	0.342	0.227	0.132	0.054	0.215
222	0.198	0.545	0.551	0.411	0.187	0.110	0.303	0.359	0.340	0.381	0.281	0.369	0.335	0.276	0.228	0.185	0.244	0.347	0.413	0.342	0.228	0.135	0.063	0.229

223	0.222	0.579	0.587	0.442	0.210	0.113	0.300	0.355	0.337	0.377	0.278	0.365	0.332	0.273	0.227	0.185	0.242	0.344	0.409	0.339	0.227	0.137	0.073	0.257
224	0.231	0.586	0.592	0.450	0.218	0.122	0.305	0.359	0.341	0.381	0.284	0.369	0.336	0.279	0.234	0.193	0.249	0.348	0.413	0.343	0.234	0.145	0.084	0.265
225	0.242	0.607	0.615	0.469	0.230	0.119	0.299	0.353	0.335	0.375	0.278	0.363	0.330	0.273	0.228	0.187	0.243	0.342	0.407	0.337	0.228	0.141	0.086	0.279
226	0.236	0.587	0.592	0.453	0.224	0.132	0.311	0.365	0.347	0.387	0.290	0.375	0.342	0.286	0.242	0.201	0.256	0.354	0.418	0.349	0.241	0.155	0.092	0.269
227	0.255	0.616	0.622	0.479	0.242	0.131	0.306	0.360	0.342	0.382	0.286	0.370	0.337	0.281	0.237	0.198	0.251	0.349	0.413	0.344	0.237	0.152	0.098	0.291
228	0.255	0.609	0.614	0.474	0.242	0.139	0.314	0.368	0.350	0.389	0.294	0.377	0.345	0.289	0.246	0.206	0.259	0.357	0.420	0.352	0.245	0.161	0.103	0.289
229	0.290	0.669	0.679	0.529	0.277	0.132	0.300	0.353	0.335	0.374	0.279	0.362	0.330	0.275	0.232	0.194	0.245	0.341	0.405	0.337	0.231	0.151	0.112	0.332
230	0.291	0.666	0.674	0.527	0.277	0.140	0.304	0.357	0.339	0.378	0.285	0.366	0.335	0.280	0.238	0.201	0.251	0.346	0.409	0.341	0.237	0.159	0.118	0.331
231	0.076	0.129	0.075	0.092	0.061	0.354	0.562	0.608	0.592	0.626	0.544	0.614	0.590	0.540	0.497	0.454	0.510	0.598	0.649	0.594	0.494	0.391	0.189	0.049
232	0.087	0.126	0.076	0.094	0.072	0.377	0.580	0.626	0.610	0.642	0.562	0.631	0.607	0.559	0.517	0.475	0.530	0.616	0.665	0.611	0.514	0.413	0.211	0.056
233	0.089	0.148	0.094	0.109	0.073	0.355	0.559	0.605	0.589	0.623	0.541	0.611	0.587	0.537	0.495	0.453	0.508	0.595	0.646	0.591	0.492	0.390	0.194	0.059
234	0.094	0.164	0.111	0.121	0.078	0.346	0.550	0.597	0.580	0.614	0.532	0.602	0.578	0.528	0.485	0.443	0.498	0.586	0.638	0.582	0.483	0.381	0.190	0.063
235	0.104	0.165	0.109	0.126	0.089	0.362	0.563	0.608	0.592	0.626	0.545	0.614	0.590	0.541	0.500	0.458	0.512	0.598	0.649	0.594	0.497	0.397	0.205	0.068
236	0.113	0.180	0.125	0.140	0.096	0.361	0.559	0.604	0.588	0.621	0.541	0.610	0.586	0.538	0.497	0.455	0.508	0.594	0.644	0.590	0.493	0.395	0.209	0.075
237	0.128	0.206	0.158	0.163	0.110	0.356	0.551	0.596	0.580	0.613	0.533	0.601	0.578	0.529	0.489	0.448	0.500	0.586	0.636	0.582	0.485	0.389	0.212	0.092
238	0.148	0.217	0.162	0.179	0.130	0.379	0.566	0.610	0.595	0.627	0.549	0.615	0.593	0.546	0.507	0.468	0.517	0.601	0.649	0.596	0.503	0.411	0.238	0.109
239	0.145	0.235	0.184	0.189	0.127	0.356	0.545	0.590	0.574	0.607	0.527	0.595	0.572	0.524	0.484	0.445	0.495	0.580	0.630	0.576	0.481	0.387	0.219	0.111
240	0.153	0.230	0.176	0.189	0.134	0.374	0.560	0.604	0.588	0.620	0.542	0.609	0.586	0.539	0.500	0.462	0.511	0.594	0.643	0.590	0.496	0.405	0.235	0.115

Table 18: MO values of all DGs at each scenario (APSO)

MO values (APSO)																								
DGs	*S 1*	*S 2*	*S 3*	*S 4*	*S 5*	*S 6*	*S 7*	*S 8*	*S 9*	*S 10*	*S 11*	*S 12*	*S 13*	*S 14*	*S 15*	*S 16*	*S 17*	*S 18*	*S 19*	*S 20*	*S 21*	*S 22*	*S 23*	*S 24*
1	0.556	0.693	0.735	0.642	0.541	0.545	0.644	0.670	0.666	0.682	0.633	0.680	0.658	0.628	0.605	0.584	0.619	0.664	0.699	0.662	0.607	0.558	0.510	0.586
2	0.556	0.693	0.734	0.642	0.541	0.545	0.644	0.670	0.666	0.682	0.633	0.680	0.658	0.629	0.606	0.584	0.619	0.664	0.699	0.662	0.607	0.558	0.510	0.586
3	0.556	0.692	0.734	0.642	0.541	0.546	0.644	0.671	0.666	0.682	0.633	0.680	0.659	0.629	0.606	0.585	0.620	0.665	0.699	0.663	0.608	0.559	0.511	0.586
4	0.556	0.694	0.735	0.643	0.541	0.544	0.643	0.670	0.665	0.681	0.632	0.679	0.658	0.628	0.605	0.584	0.618	0.664	0.698	0.661	0.606	0.557	0.510	0.587
5	0.557	0.691	0.733	0.642	0.542	0.548	0.646	0.673	0.668	0.684	0.636	0.682	0.661	0.631	0.608	0.587	0.622	0.667	0.701	0.664	0.610	0.561	0.513	0.587
6	0.557	0.697	0.740	0.646	0.543	0.543	0.641	0.668	0.663	0.679	0.630	0.677	0.656	0.626	0.603	0.582	0.616	0.662	0.696	0.659	0.604	0.555	0.509	0.589
7	0.560	0.704	0.747	0.651	0.545	0.540	0.638	0.665	0.660	0.676	0.627	0.674	0.653	0.623	0.600	0.579	0.613	0.659	0.693	0.656	0.601	0.553	0.509	0.592
8	0.565	0.702	0.744	0.653	0.549	0.549	0.645	0.671	0.667	0.683	0.635	0.681	0.660	0.630	0.608	0.587	0.621	0.665	0.699	0.663	0.609	0.561	0.518	0.595
9	0.601	0.724	0.761	0.682	0.585	0.586	0.671	0.695	0.691	0.705	0.662	0.704	0.684	0.658	0.638	0.619	0.649	0.689	0.720	0.687	0.638	0.596	0.559	0.628
10	0.647	0.766	0.800	0.727	0.630	0.617	0.689	0.711	0.707	0.721	0.681	0.719	0.701	0.678	0.660	0.644	0.670	0.706	0.735	0.704	0.660	0.624	0.599	0.674
11	0.658	0.598	0.592	0.622	0.643	0.816	0.874	0.886	0.884	0.891	0.869	0.890	0.880	0.867	0.857	0.846	0.862	0.882	0.898	0.881	0.855	0.825	0.758	0.634
12	0.658	0.598	0.592	0.622	0.643	0.816	0.874	0.886	0.884	0.891	0.869	0.890	0.880	0.867	0.857	0.846	0.862	0.882	0.898	0.881	0.854	0.825	0.758	0.634
13	0.658	0.598	0.592	0.622	0.643	0.816	0.873	0.886	0.884	0.891	0.869	0.890	0.880	0.867	0.856	0.845	0.862	0.882	0.897	0.880	0.854	0.825	0.758	0.634
14	0.661	0.598	0.591	0.624	0.646	0.820	0.877	0.889	0.887	0.894	0.872	0.893	0.883	0.870	0.860	0.849	0.865	0.885	0.900	0.884	0.858	0.829	0.762	0.636
15	0.663	0.599	0.592	0.624	0.648	0.822	0.878	0.890	0.888	0.895	0.873	0.894	0.885	0.872	0.861	0.851	0.867	0.886	0.902	0.885	0.859	0.831	0.764	0.638
16	0.668	0.606	0.600	0.632	0.653	0.822	0.877	0.889	0.887	0.894	0.873	0.893	0.884	0.871	0.861	0.851	0.866	0.885	0.900	0.884	0.859	0.831	0.766	0.644
17	0.688	0.613	0.603	0.643	0.674	0.846	0.896	0.906	0.904	0.910	0.892	0.909	0.901	0.890	0.881	0.872	0.886	0.903	0.916	0.901	0.879	0.854	0.791	0.661
18	0.677	0.620	0.615	0.643	0.662	0.822	0.875	0.887	0.885	0.892	0.871	0.891	0.882	0.869	0.859	0.849	0.864	0.884	0.899	0.882	0.858	0.830	0.769	0.655
19	0.732	0.640	0.625	0.680	0.716	0.889	0.925	0.932	0.931	0.936	0.922	0.935	0.929	0.921	0.916	0.909	0.918	0.930	0.940	0.928	0.912	0.894	0.840	0.701
20	0.739	0.672	0.663	0.704	0.721	0.866	0.902	0.910	0.909	0.914	0.899	0.913	0.906	0.898	0.892	0.885	0.894	0.907	0.918	0.906	0.888	0.870	0.825	0.715
21	0.704	0.600	0.583	0.641	0.689	0.885	0.927	0.936	0.934	0.939	0.924	0.938	0.932	0.923	0.917	0.909	0.920	0.933	0.943	0.931	0.914	0.891	0.827	0.666
22	0.704	0.600	0.583	0.641	0.689	0.884	0.927	0.935	0.934	0.939	0.924	0.938	0.932	0.923	0.916	0.909	0.919	0.933	0.943	0.931	0.913	0.891	0.827	0.666
23	0.704	0.600	0.583	0.641	0.689	0.885	0.928	0.936	0.935	0.939	0.925	0.938	0.932	0.924	0.917	0.909	0.920	0.933	0.943	0.931	0.914	0.892	0.827	0.666
24	0.704	0.600	0.583	0.641	0.689	0.885	0.927	0.936	0.934	0.939	0.924	0.938	0.932	0.923	0.917	0.909	0.920	0.933	0.943	0.931	0.914	0.891	0.827	0.666
25	0.704	0.600	0.584	0.641	0.689	0.885	0.928	0.936	0.935	0.939	0.925	0.938	0.932	0.924	0.917	0.909	0.920	0.933	0.943	0.931	0.914	0.892	0.827	0.667
26	0.703	0.600	0.584	0.641	0.688	0.884	0.927	0.935	0.934	0.938	0.924	0.937	0.931	0.923	0.916	0.908	0.919	0.932	0.942	0.931	0.913	0.890	0.826	0.666

27	0.698	0.600	0.585	0.639	0.683	0.877	0.921	0.930	0.928	0.933	0.918	0.932	0.926	0.917	0.910	0.902	0.913	0.927	0.938	0.925	0.907	0.884	0.819	0.662
28	0.718	0.604	0.586	0.649	0.703	0.900	0.939	0.947	0.946	0.950	0.937	0.949	0.943	0.936	0.930	0.923	0.932	0.944	0.953	0.943	0.927	0.906	0.843	0.679
29	0.718	0.607	0.589	0.651	0.703	0.897	0.936	0.944	0.943	0.947	0.934	0.946	0.941	0.933	0.927	0.920	0.929	0.941	0.951	0.940	0.924	0.903	0.841	0.680
30	0.717	0.615	0.599	0.655	0.703	0.887	0.927	0.936	0.934	0.939	0.924	0.938	0.932	0.923	0.917	0.910	0.920	0.933	0.943	0.931	0.914	0.893	0.832	0.682
31	0.560	0.591	0.608	0.579	0.544	0.668	0.756	0.777	0.774	0.786	0.748	0.784	0.768	0.745	0.726	0.708	0.737	0.772	0.798	0.770	0.726	0.682	0.609	0.561
32	0.560	0.590	0.608	0.579	0.544	0.668	0.757	0.777	0.774	0.786	0.748	0.784	0.768	0.745	0.726	0.708	0.737	0.772	0.798	0.770	0.726	0.682	0.609	0.561
33	0.560	0.591	0.608	0.579	0.544	0.668	0.756	0.777	0.774	0.786	0.748	0.784	0.768	0.745	0.726	0.708	0.737	0.772	0.798	0.770	0.726	0.682	0.609	0.561
34	0.560	0.590	0.608	0.579	0.544	0.669	0.757	0.778	0.774	0.786	0.748	0.785	0.768	0.745	0.727	0.709	0.737	0.772	0.799	0.770	0.726	0.682	0.609	0.561
35	0.560	0.590	0.607	0.579	0.544	0.669	0.757	0.778	0.774	0.786	0.749	0.785	0.768	0.745	0.727	0.709	0.737	0.773	0.799	0.770	0.727	0.682	0.610	0.561
36	0.557	0.593	0.612	0.579	0.542	0.661	0.750	0.772	0.768	0.780	0.742	0.779	0.762	0.739	0.720	0.701	0.730	0.766	0.793	0.764	0.720	0.675	0.603	0.560
37	0.566	0.592	0.607	0.582	0.550	0.677	0.763	0.784	0.780	0.792	0.755	0.791	0.775	0.752	0.734	0.717	0.744	0.779	0.804	0.777	0.734	0.690	0.618	0.565
38	0.573	0.609	0.627	0.595	0.558	0.668	0.753	0.774	0.771	0.783	0.745	0.781	0.765	0.742	0.724	0.706	0.734	0.769	0.795	0.767	0.724	0.680	0.613	0.575
39	0.597	0.612	0.624	0.606	0.582	0.704	0.782	0.800	0.797	0.808	0.775	0.807	0.792	0.772	0.755	0.740	0.765	0.796	0.819	0.794	0.755	0.715	0.649	0.594
40	0.778	0.858	0.878	0.838	0.763	0.737	0.773	0.787	0.784	0.793	0.768	0.792	0.780	0.766	0.756	0.748	0.761	0.783	0.803	0.782	0.756	0.738	0.741	0.797
41	0.529	0.686	0.733	0.628	0.513	0.510	0.616	0.645	0.640	0.657	0.605	0.655	0.632	0.600	0.575	0.553	0.590	0.638	0.675	0.636	0.577	0.524	0.474	0.564
42	0.529	0.686	0.733	0.628	0.513	0.511	0.616	0.645	0.640	0.657	0.605	0.655	0.632	0.600	0.575	0.553	0.590	0.638	0.675	0.636	0.577	0.524	0.474	0.564
43	0.529	0.686	0.733	0.628	0.513	0.511	0.616	0.645	0.640	0.657	0.605	0.655	0.632	0.600	0.576	0.553	0.590	0.639	0.675	0.636	0.577	0.525	0.474	0.564
44	0.529	0.687	0.734	0.629	0.513	0.510	0.616	0.644	0.639	0.656	0.604	0.654	0.631	0.599	0.575	0.552	0.589	0.638	0.674	0.635	0.576	0.524	0.473	0.564
45	0.529	0.682	0.728	0.626	0.514	0.516	0.621	0.649	0.644	0.661	0.610	0.659	0.637	0.605	0.580	0.558	0.595	0.643	0.679	0.640	0.582	0.529	0.478	0.563
46	0.529	0.683	0.729	0.627	0.514	0.514	0.620	0.648	0.643	0.660	0.608	0.658	0.635	0.604	0.579	0.557	0.594	0.642	0.678	0.639	0.581	0.528	0.477	0.564
47	0.530	0.689	0.737	0.631	0.514	0.508	0.614	0.643	0.638	0.655	0.603	0.653	0.630	0.598	0.573	0.551	0.588	0.636	0.673	0.634	0.575	0.522	0.473	0.566
48	0.532	0.688	0.735	0.631	0.516	0.513	0.618	0.646	0.642	0.659	0.607	0.657	0.634	0.602	0.578	0.555	0.592	0.640	0.676	0.637	0.579	0.527	0.478	0.567
49	0.549	0.695	0.739	0.642	0.533	0.533	0.633	0.661	0.656	0.672	0.622	0.670	0.648	0.618	0.594	0.573	0.608	0.654	0.689	0.652	0.596	0.546	0.499	0.581
50	0.563	0.712	0.756	0.658	0.548	0.537	0.634	0.661	0.656	0.673	0.623	0.671	0.649	0.619	0.596	0.575	0.609	0.655	0.690	0.652	0.597	0.549	0.508	0.597
51	0.966	1.607	1.749	1.406	0.959	0.264	0.269	0.302	0.296	0.318	0.257	0.315	0.286	0.252	0.233	0.223	0.244	0.295	0.344	0.293	0.236	0.241	0.470	1.143
52	0.966	1.607	1.749	1.406	0.959	0.264	0.269	0.302	0.296	0.318	0.257	0.316	0.286	0.252	0.233	0.223	0.244	0.295	0.344	0.293	0.236	0.241	0.470	1.143
53	0.966	1.607	1.749	1.406	0.959	0.264	0.269	0.302	0.295	0.318	0.257	0.315	0.286	0.252	0.232	0.223	0.244	0.295	0.344	0.293	0.236	0.241	0.470	1.143
54	0.968	1.610	1.752	1.409	0.960	0.264	0.268	0.301	0.295	0.317	0.256	0.315	0.286	0.252	0.232	0.223	0.243	0.294	0.344	0.292	0.236	0.241	0.471	1.145

55	0.969	1.611	1.752	1.409	0.961	0.264	0.269	0.302	0.295	0.318	0.256	0.315	0.286	0.252	0.232	0.223	0.244	0.295	0.344	0.292	0.236	0.241	0.471	1.146
56	0.969	1.610	1.752	1.409	0.961	0.265	0.269	0.302	0.296	0.318	0.257	0.316	0.286	0.252	0.233	0.224	0.244	0.295	0.344	0.293	0.236	0.241	0.471	1.145
57	0.977	1.623	1.766	1.421	0.970	0.265	0.267	0.300	0.294	0.316	0.255	0.313	0.284	0.250	0.231	0.223	0.242	0.293	0.342	0.291	0.235	0.241	0.475	1.155
58	0.996	1.654	1.798	1.450	0.988	0.267	0.261	0.294	0.288	0.310	0.250	0.307	0.278	0.245	0.227	0.221	0.237	0.287	0.336	0.285	0.230	0.241	0.483	1.177
59	1.033	1.697	1.842	1.495	1.024	0.285	0.269	0.298	0.292	0.313	0.258	0.310	0.284	0.254	0.239	0.236	0.247	0.292	0.337	0.289	0.241	0.257	0.511	1.217
60	1.054	1.720	1.863	1.517	1.045	0.293	0.274	0.302	0.297	0.317	0.264	0.315	0.289	0.260	0.246	0.243	0.253	0.296	0.342	0.294	0.248	0.265	0.524	1.239
61	2.238	3.454	3.676	3.138	2.243	0.454	0.115	0.107	0.105	0.114	0.126	0.113	0.106	0.131	0.173	0.235	0.145	0.105	0.130	0.106	0.168	0.352	1.090	2.596
62	2.237	3.453	3.675	3.137	2.242	0.453	0.115	0.107	0.105	0.114	0.126	0.113	0.106	0.131	0.173	0.235	0.145	0.105	0.130	0.106	0.167	0.352	1.089	2.595
63	2.237	3.452	3.674	3.137	2.241	0.453	0.115	0.107	0.105	0.114	0.126	0.113	0.106	0.131	0.173	0.235	0.145	0.105	0.130	0.106	0.167	0.352	1.089	2.594
64	2.238	3.454	3.676	3.138	2.243	0.454	0.115	0.107	0.105	0.114	0.126	0.113	0.106	0.131	0.173	0.235	0.145	0.105	0.130	0.106	0.168	0.352	1.090	2.596
65	2.236	3.452	3.674	3.136	2.241	0.453	0.115	0.106	0.105	0.113	0.126	0.112	0.106	0.131	0.173	0.235	0.145	0.105	0.130	0.106	0.167	0.351	1.089	2.594
66	2.242	3.460	3.682	3.144	2.247	0.455	0.115	0.106	0.105	0.113	0.126	0.112	0.106	0.131	0.173	0.236	0.145	0.105	0.129	0.106	0.168	0.353	1.092	2.600
67	2.218	3.427	3.648	3.112	2.222	0.449	0.116	0.108	0.106	0.115	0.126	0.114	0.107	0.131	0.172	0.233	0.145	0.107	0.132	0.107	0.167	0.349	1.079	2.573
68	2.210	3.415	3.637	3.102	2.214	0.449	0.117	0.108	0.107	0.115	0.127	0.114	0.108	0.132	0.173	0.234	0.146	0.108	0.132	0.108	0.168	0.348	1.076	2.564
69	2.273	3.499	3.722	3.182	2.277	0.465	0.118	0.108	0.107	0.114	0.129	0.113	0.108	0.134	0.177	0.241	0.148	0.107	0.129	0.108	0.172	0.361	1.111	2.634
70	2.289	3.518	3.741	3.202	2.292	0.473	0.122	0.110	0.110	0.114	0.133	0.113	0.112	0.139	0.183	0.248	0.154	0.110	0.129	0.111	0.177	0.368	1.125	2.651
71	2.759	4.148	4.390	3.806	2.768	0.588	0.121	0.093	0.096	0.087	0.139	0.088	0.102	0.148	0.211	0.299	0.169	0.097	0.096	0.099	0.202	0.454	1.390	3.173
72	2.757	4.146	4.388	3.804	2.767	0.587	0.121	0.093	0.096	0.087	0.139	0.088	0.102	0.147	0.210	0.298	0.169	0.097	0.096	0.099	0.202	0.454	1.389	3.172
73	2.759	4.149	4.391	3.807	2.769	0.588	0.121	0.093	0.096	0.087	0.139	0.088	0.102	0.148	0.211	0.299	0.169	0.097	0.096	0.099	0.202	0.454	1.390	3.174
74	2.760	4.150	4.392	3.808	2.770	0.588	0.121	0.093	0.096	0.087	0.139	0.088	0.102	0.148	0.211	0.299	0.169	0.097	0.096	0.099	0.202	0.455	1.391	3.175
75	2.759	4.149	4.391	3.807	2.769	0.588	0.121	0.093	0.096	0.087	0.139	0.088	0.102	0.148	0.211	0.299	0.169	0.097	0.096	0.099	0.202	0.454	1.390	3.174
76	2.770	4.164	4.406	3.821	2.780	0.591	0.121	0.093	0.096	0.087	0.139	0.088	0.103	0.148	0.212	0.300	0.170	0.097	0.096	0.100	0.203	0.457	1.397	3.186
77	2.772	4.166	4.409	3.824	2.782	0.592	0.121	0.093	0.096	0.087	0.139	0.088	0.103	0.148	0.212	0.301	0.170	0.097	0.096	0.100	0.204	0.457	1.398	3.188
78	2.734	4.115	4.357	3.775	2.743	0.582	0.120	0.093	0.096	0.089	0.138	0.089	0.103	0.147	0.209	0.296	0.168	0.097	0.098	0.100	0.201	0.449	1.376	3.146
79	2.811	4.215	4.459	3.871	2.821	0.604	0.123	0.094	0.097	0.088	0.142	0.088	0.104	0.151	0.217	0.307	0.173	0.098	0.095	0.101	0.208	0.467	1.422	3.231
80	2.830	4.241	4.485	3.897	2.839	0.611	0.125	0.095	0.098	0.089	0.144	0.089	0.106	0.154	0.220	0.311	0.176	0.100	0.094	0.102	0.211	0.472	1.434	3.251
81	2.654	4.011	4.250	3.674	2.663	0.558	0.117	0.092	0.095	0.090	0.133	0.090	0.100	0.142	0.200	0.283	0.161	0.096	0.101	0.098	0.193	0.431	1.328	3.058
82	2.655	4.013	4.252	3.675	2.664	0.558	0.117	0.092	0.095	0.090	0.133	0.090	0.101	0.142	0.200	0.283	0.161	0.096	0.101	0.098	0.193	0.431	1.329	3.059

83	2.651	4.008	4.246	3.670	2.660	0.557	0.117	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.200	0.283	0.161	0.096	0.101	0.098	0.192	0.430	1.326	3.055
84	2.651	4.008	4.247	3.671	2.661	0.557	0.117	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.200	0.283	0.161	0.096	0.101	0.098	0.192	0.430	1.326	3.055
85	2.658	4.017	4.256	3.679	2.667	0.559	0.117	0.092	0.095	0.090	0.134	0.089	0.101	0.142	0.201	0.284	0.162	0.096	0.101	0.098	0.193	0.432	1.330	3.062
86	2.643	3.997	4.236	3.660	2.652	0.555	0.117	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.282	0.161	0.096	0.101	0.098	0.192	0.429	1.322	3.046
87	2.642	3.995	4.233	3.658	2.650	0.555	0.117	0.092	0.095	0.091	0.133	0.091	0.101	0.141	0.199	0.282	0.161	0.096	0.102	0.098	0.192	0.429	1.321	3.044
88	2.675	4.038	4.278	3.700	2.684	0.565	0.118	0.093	0.095	0.090	0.135	0.091	0.101	0.143	0.203	0.287	0.163	0.097	0.101	0.099	0.195	0.436	1.341	3.081
89	2.689	4.054	4.293	3.716	2.698	0.571	0.121	0.095	0.098	0.092	0.138	0.093	0.104	0.146	0.207	0.291	0.167	0.099	0.102	0.101	0.199	0.442	1.351	3.096
90	2.699	4.063	4.301	3.725	2.708	0.576	0.123	0.099	0.101	0.097	0.140	0.097	0.106	0.149	0.209	0.294	0.169	0.102	0.106	0.104	0.202	0.446	1.357	3.106
91	3.032	4.504	4.754	4.151	3.044	0.668	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.240	0.341	0.190	0.102	0.086	0.105	0.230	0.517	1.554	3.474
92	3.032	4.504	4.755	4.151	3.044	0.668	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.240	0.341	0.190	0.102	0.086	0.105	0.230	0.517	1.554	3.475
93	3.031	4.503	4.754	4.150	3.043	0.668	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.239	0.341	0.190	0.102	0.086	0.105	0.229	0.517	1.553	3.474
94	3.032	4.504	4.755	4.152	3.044	0.669	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.240	0.341	0.190	0.102	0.086	0.105	0.230	0.517	1.554	3.475
95	3.028	4.499	4.749	4.146	3.040	0.667	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.239	0.341	0.190	0.102	0.086	0.105	0.229	0.516	1.551	3.470
96	3.032	4.503	4.754	4.151	3.044	0.668	0.132	0.096	0.100	0.087	0.154	0.088	0.109	0.165	0.239	0.341	0.190	0.102	0.086	0.105	0.230	0.517	1.553	3.474
97	3.038	4.511	4.762	4.158	3.050	0.670	0.132	0.096	0.100	0.087	0.155	0.088	0.109	0.165	0.240	0.342	0.191	0.102	0.086	0.105	0.230	0.519	1.557	3.481
98	3.037	4.511	4.761	4.158	3.050	0.670	0.132	0.096	0.100	0.087	0.155	0.089	0.109	0.165	0.240	0.342	0.191	0.102	0.086	0.105	0.230	0.519	1.557	3.480
99	3.006	4.470	4.720	4.118	3.017	0.662	0.132	0.096	0.101	0.088	0.154	0.089	0.109	0.164	0.238	0.338	0.189	0.102	0.087	0.105	0.228	0.512	1.539	3.446
100	3.003	4.441	4.684	4.096	3.013	0.683	0.155	0.119	0.124	0.111	0.177	0.112	0.132	0.187	0.261	0.360	0.212	0.125	0.109	0.128	0.251	0.534	1.552	3.436
101	2.062	3.214	3.429	2.909	2.067	0.411	0.117	0.121	0.118	0.130	0.124	0.128	0.115	0.129	0.162	0.216	0.140	0.119	0.148	0.119	0.159	0.320	0.991	2.399
102	2.062	3.215	3.429	2.909	2.067	0.411	0.117	0.121	0.118	0.130	0.124	0.128	0.115	0.129	0.162	0.216	0.140	0.119	0.148	0.119	0.159	0.320	0.991	2.400
103	2.062	3.214	3.429	2.909	2.067	0.411	0.117	0.121	0.118	0.130	0.124	0.128	0.115	0.129	0.162	0.216	0.140	0.119	0.148	0.119	0.159	0.320	0.991	2.399
104	2.065	3.218	3.433	2.912	2.069	0.412	0.117	0.121	0.118	0.129	0.124	0.128	0.115	0.129	0.163	0.216	0.140	0.119	0.148	0.118	0.159	0.320	0.993	2.402
105	2.051	3.200	3.414	2.895	2.056	0.408	0.117	0.122	0.119	0.130	0.125	0.129	0.116	0.129	0.162	0.215	0.139	0.119	0.149	0.119	0.158	0.318	0.985	2.387
106	2.068	3.222	3.436	2.916	2.072	0.412	0.117	0.121	0.118	0.129	0.125	0.128	0.115	0.129	0.163	0.217	0.140	0.119	0.148	0.118	0.159	0.321	0.994	2.405
107	2.077	3.233	3.448	2.927	2.081	0.416	0.117	0.121	0.118	0.129	0.125	0.128	0.115	0.129	0.164	0.219	0.141	0.119	0.148	0.119	0.160	0.324	1.000	2.415
108	2.074	3.229	3.444	2.923	2.079	0.415	0.118	0.121	0.119	0.130	0.126	0.129	0.116	0.130	0.164	0.219	0.141	0.119	0.148	0.119	0.160	0.323	0.999	2.412
109	2.101	3.264	3.480	2.957	2.106	0.423	0.119	0.121	0.119	0.129	0.127	0.128	0.116	0.131	0.167	0.223	0.143	0.119	0.147	0.119	0.163	0.330	1.015	2.442
110	2.146	3.322	3.539	3.014	2.151	0.437	0.121	0.122	0.120	0.129	0.130	0.128	0.118	0.135	0.173	0.231	0.147	0.121	0.146	0.121	0.169	0.341	1.043	2.492

111	2.975	4.408	4.651	4.063	2.986	0.671	0.151	0.116	0.120	0.108	0.172	0.109	0.129	0.182	0.254	0.353	0.207	0.122	0.109	0.125	0.245	0.524	1.533	3.406
112	2.974	4.407	4.651	4.063	2.986	0.671	0.151	0.116	0.120	0.108	0.172	0.109	0.129	0.182	0.254	0.353	0.207	0.122	0.109	0.125	0.245	0.524	1.532	3.406
113	2.966	4.397	4.640	4.052	2.978	0.669	0.150	0.116	0.120	0.108	0.172	0.109	0.129	0.182	0.254	0.351	0.206	0.122	0.110	0.125	0.244	0.522	1.528	3.397
114	2.976	4.409	4.653	4.065	2.988	0.672	0.151	0.116	0.120	0.108	0.172	0.109	0.129	0.183	0.255	0.353	0.207	0.122	0.109	0.125	0.245	0.525	1.533	3.408
115	2.968	4.399	4.642	4.054	2.979	0.669	0.151	0.116	0.120	0.108	0.172	0.109	0.129	0.182	0.254	0.352	0.206	0.122	0.109	0.125	0.244	0.523	1.529	3.398
116	3.016	4.460	4.704	4.113	3.027	0.683	0.153	0.117	0.121	0.108	0.175	0.110	0.130	0.185	0.259	0.360	0.211	0.123	0.109	0.126	0.250	0.534	1.557	3.451
117	2.991	4.428	4.672	4.084	3.001	0.678	0.153	0.117	0.122	0.109	0.174	0.110	0.130	0.185	0.257	0.357	0.209	0.123	0.108	0.126	0.248	0.530	1.544	3.423
118	2.898	4.305	4.545	3.965	2.908	0.653	0.152	0.119	0.123	0.112	0.172	0.113	0.131	0.182	0.251	0.345	0.205	0.125	0.114	0.127	0.242	0.511	1.490	3.321
119	3.072	4.531	4.777	4.184	3.082	0.705	0.159	0.122	0.126	0.112	0.182	0.114	0.135	0.193	0.270	0.373	0.219	0.128	0.110	0.131	0.259	0.552	1.594	3.512
120	3.423	4.976	5.230	4.620	3.435	0.824	0.188	0.138	0.144	0.124	0.216	0.126	0.157	0.230	0.323	0.445	0.262	0.146	0.116	0.150	0.309	0.650	1.815	3.894
121	2.502	3.763	3.984	3.445	2.509	0.561	0.161	0.141	0.143	0.142	0.176	0.142	0.147	0.183	0.235	0.309	0.200	0.144	0.154	0.146	0.229	0.445	1.269	2.878
122	2.502	3.762	3.984	3.445	2.509	0.561	0.161	0.141	0.143	0.142	0.176	0.142	0.147	0.183	0.235	0.309	0.200	0.144	0.155	0.146	0.229	0.445	1.269	2.878
123	2.501	3.762	3.983	3.444	2.508	0.561	0.161	0.141	0.143	0.142	0.176	0.142	0.147	0.183	0.235	0.309	0.200	0.144	0.155	0.146	0.229	0.445	1.268	2.877
124	2.500	3.760	3.982	3.443	2.507	0.561	0.161	0.141	0.143	0.143	0.176	0.142	0.148	0.183	0.235	0.309	0.200	0.144	0.155	0.146	0.229	0.445	1.268	2.876
125	2.512	3.776	3.998	3.458	2.519	0.564	0.162	0.141	0.143	0.142	0.176	0.142	0.148	0.183	0.236	0.311	0.201	0.144	0.154	0.146	0.230	0.448	1.275	2.889
126	2.534	3.803	4.026	3.485	2.541	0.570	0.163	0.141	0.143	0.142	0.177	0.142	0.148	0.185	0.238	0.314	0.203	0.144	0.154	0.147	0.232	0.452	1.287	2.913
127	2.515	3.779	4.001	3.461	2.522	0.565	0.163	0.141	0.143	0.142	0.177	0.142	0.148	0.184	0.237	0.312	0.202	0.145	0.154	0.147	0.231	0.449	1.277	2.892
128	2.606	3.897	4.121	3.576	2.614	0.593	0.167	0.144	0.146	0.143	0.183	0.143	0.151	0.191	0.247	0.327	0.210	0.147	0.153	0.150	0.241	0.471	1.332	2.993
129	2.556	3.824	4.045	3.507	2.562	0.585	0.171	0.149	0.151	0.149	0.186	0.149	0.156	0.194	0.248	0.326	0.212	0.152	0.160	0.154	0.242	0.466	1.306	2.935
130	2.701	3.997	4.219	3.679	2.709	0.639	0.191	0.164	0.167	0.163	0.208	0.163	0.173	0.216	0.277	0.361	0.237	0.168	0.172	0.171	0.270	0.512	1.402	3.092
131	1.967	3.066	3.271	2.771	1.969	0.409	0.139	0.146	0.143	0.155	0.145	0.154	0.139	0.149	0.179	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.952	2.288
132	1.967	3.065	3.271	2.771	1.969	0.409	0.139	0.146	0.143	0.155	0.145	0.154	0.139	0.149	0.179	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.952	2.288
133	1.966	3.065	3.270	2.770	1.968	0.409	0.139	0.146	0.143	0.155	0.145	0.154	0.139	0.149	0.179	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.951	2.287
134	1.966	3.064	3.270	2.770	1.968	0.409	0.139	0.146	0.143	0.155	0.145	0.154	0.139	0.149	0.179	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.951	2.287
135	1.968	3.068	3.273	2.773	1.971	0.409	0.139	0.146	0.143	0.155	0.145	0.154	0.139	0.149	0.179	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.953	2.289
136	1.965	3.064	3.269	2.770	1.968	0.409	0.139	0.146	0.143	0.155	0.146	0.153	0.140	0.149	0.180	0.228	0.159	0.143	0.174	0.143	0.176	0.324	0.951	2.286
137	1.954	3.048	3.253	2.755	1.956	0.407	0.140	0.147	0.144	0.156	0.146	0.155	0.140	0.150	0.180	0.228	0.159	0.144	0.175	0.144	0.176	0.323	0.946	2.274
138	1.943	3.031	3.235	2.739	1.945	0.406	0.142	0.150	0.147	0.159	0.148	0.158	0.143	0.151	0.181	0.229	0.161	0.147	0.178	0.147	0.178	0.323	0.941	2.261

139	1.959	3.051	3.255	2.759	1.961	0.412	0.144	0.151	0.149	0.160	0.150	0.159	0.145	0.154	0.184	0.233	0.163	0.149	0.178	0.149	0.181	0.328	0.952	2.278
140	2.043	3.160	3.367	2.865	2.045	0.438	0.148	0.151	0.149	0.159	0.155	0.158	0.147	0.160	0.194	0.247	0.171	0.149	0.176	0.149	0.190	0.348	1.003	2.370
141	1.618	2.604	2.798	2.328	1.617	0.315	0.137	0.157	0.153	0.170	0.132	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.146	0.251	0.753	1.901
142	1.618	2.605	2.798	2.328	1.618	0.315	0.137	0.157	0.153	0.170	0.132	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.146	0.251	0.753	1.902
143	1.616	2.601	2.795	2.325	1.615	0.315	0.137	0.158	0.153	0.170	0.133	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.146	0.251	0.752	1.899
144	1.616	2.602	2.796	2.326	1.616	0.315	0.137	0.157	0.153	0.170	0.132	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.146	0.251	0.752	1.899
145	1.616	2.602	2.796	2.326	1.616	0.315	0.137	0.158	0.153	0.170	0.133	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.146	0.251	0.752	1.899
146	1.616	2.601	2.795	2.325	1.615	0.315	0.137	0.158	0.153	0.170	0.133	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.147	0.251	0.752	1.899
147	1.617	2.604	2.797	2.328	1.617	0.315	0.137	0.157	0.153	0.170	0.132	0.168	0.147	0.132	0.148	0.181	0.136	0.153	0.193	0.152	0.147	0.251	0.753	1.901
148	1.601	2.581	2.774	2.306	1.601	0.312	0.138	0.159	0.154	0.172	0.134	0.170	0.148	0.133	0.148	0.180	0.137	0.154	0.195	0.153	0.147	0.249	0.745	1.883
149	1.601	2.581	2.773	2.306	1.601	0.313	0.139	0.160	0.155	0.172	0.135	0.171	0.149	0.134	0.149	0.181	0.138	0.155	0.196	0.154	0.147	0.250	0.745	1.883
150	1.611	2.593	2.785	2.317	1.610	0.316	0.140	0.160	0.155	0.172	0.135	0.171	0.149	0.135	0.150	0.182	0.138	0.155	0.195	0.154	0.148	0.252	0.751	1.893
151	1.352	2.222	2.400	1.969	1.349	0.273	0.168	0.195	0.189	0.209	0.160	0.207	0.182	0.157	0.154	0.174	0.154	0.189	0.234	0.187	0.154	0.225	0.622	1.598
152	1.351	2.222	2.399	1.968	1.348	0.273	0.168	0.195	0.189	0.209	0.160	0.207	0.182	0.157	0.154	0.174	0.154	0.189	0.234	0.187	0.154	0.225	0.622	1.598
153	1.351	2.221	2.398	1.967	1.347	0.273	0.169	0.195	0.190	0.209	0.160	0.207	0.182	0.158	0.154	0.174	0.154	0.189	0.234	0.188	0.154	0.224	0.622	1.597
154	1.351	2.221	2.398	1.967	1.347	0.273	0.168	0.195	0.189	0.209	0.160	0.207	0.182	0.157	0.154	0.174	0.154	0.189	0.234	0.188	0.154	0.224	0.622	1.597
155	1.349	2.219	2.396	1.966	1.346	0.272	0.169	0.195	0.190	0.209	0.160	0.207	0.182	0.158	0.154	0.174	0.154	0.189	0.235	0.188	0.154	0.224	0.621	1.595
156	1.353	2.224	2.401	1.970	1.349	0.273	0.168	0.195	0.189	0.209	0.160	0.207	0.182	0.157	0.155	0.175	0.154	0.189	0.234	0.187	0.155	0.225	0.623	1.599
157	1.332	2.192	2.368	1.941	1.329	0.271	0.172	0.199	0.194	0.214	0.164	0.212	0.186	0.161	0.157	0.175	0.157	0.193	0.239	0.192	0.157	0.224	0.613	1.575
158	1.364	2.235	2.413	1.981	1.360	0.276	0.171	0.197	0.192	0.211	0.163	0.209	0.184	0.160	0.157	0.176	0.157	0.191	0.236	0.190	0.158	0.228	0.629	1.611
159	1.365	2.190	2.357	1.949	1.362	0.321	0.218	0.242	0.237	0.255	0.210	0.253	0.230	0.208	0.205	0.223	0.205	0.237	0.279	0.236	0.207	0.274	0.660	1.600
160	2.220	3.312	3.506	3.038	2.222	0.571	0.246	0.241	0.240	0.244	0.253	0.243	0.241	0.257	0.293	0.356	0.267	0.241	0.253	0.241	0.287	0.470	1.172	2.543
161	1.856	2.928	3.132	2.637	1.858	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.201	0.141	0.136	0.171	0.136	0.155	0.290	0.881	2.167
162	1.855	2.928	3.132	2.637	1.858	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.201	0.141	0.137	0.171	0.136	0.155	0.290	0.881	2.167
163	1.855	2.927	3.131	2.636	1.857	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.201	0.141	0.137	0.171	0.136	0.155	0.289	0.881	2.166
164	1.856	2.929	3.133	2.638	1.858	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.201	0.141	0.137	0.171	0.136	0.156	0.290	0.881	2.168
165	1.853	2.925	3.129	2.634	1.856	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.201	0.141	0.137	0.171	0.136	0.155	0.289	0.880	2.165
166	1.857	2.930	3.134	2.638	1.859	0.368	0.126	0.140	0.136	0.150	0.130	0.149	0.132	0.132	0.158	0.202	0.141	0.136	0.171	0.136	0.156	0.290	0.882	2.168

167	1.849	2.919	3.123	2.628	1.851	0.367	0.127	0.140	0.137	0.151	0.130	0.149	0.132	0.133	0.158	0.201	0.141	0.137	0.171	0.136	0.155	0.289	0.878	2.160
168	1.870	2.947	3.152	2.655	1.872	0.372	0.127	0.139	0.135	0.149	0.130	0.148	0.131	0.133	0.159	0.203	0.141	0.136	0.170	0.135	0.156	0.292	0.889	2.183
169	1.807	2.859	3.060	2.571	1.809	0.359	0.132	0.146	0.143	0.157	0.133	0.156	0.138	0.135	0.158	0.199	0.142	0.143	0.178	0.142	0.156	0.284	0.856	2.112
170	1.884	2.965	3.169	2.672	1.886	0.376	0.128	0.139	0.136	0.149	0.132	0.148	0.132	0.135	0.161	0.206	0.143	0.136	0.169	0.136	0.158	0.296	0.898	2.198
171	2.636	3.988	4.227	3.652	2.645	0.553	0.116	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.281	0.160	0.096	0.101	0.098	0.191	0.427	1.318	3.038
172	2.636	3.988	4.227	3.652	2.645	0.553	0.116	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.281	0.160	0.096	0.101	0.098	0.191	0.427	1.318	3.038
173	2.635	3.987	4.225	3.650	2.644	0.553	0.116	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.280	0.160	0.096	0.101	0.098	0.191	0.427	1.317	3.037
174	2.635	3.987	4.225	3.650	2.644	0.553	0.116	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.280	0.160	0.096	0.101	0.098	0.191	0.427	1.317	3.037
175	2.638	3.990	4.229	3.654	2.646	0.554	0.116	0.092	0.095	0.090	0.133	0.090	0.100	0.141	0.199	0.281	0.160	0.096	0.101	0.098	0.191	0.427	1.319	3.040
176	2.625	3.973	4.211	3.637	2.633	0.550	0.116	0.092	0.095	0.090	0.132	0.090	0.100	0.140	0.198	0.279	0.160	0.096	0.102	0.098	0.190	0.425	1.311	3.026
177	2.624	3.973	4.211	3.637	2.633	0.550	0.116	0.092	0.095	0.090	0.132	0.090	0.100	0.140	0.198	0.279	0.160	0.096	0.102	0.098	0.190	0.425	1.311	3.025
178	2.622	3.969	4.207	3.633	2.630	0.550	0.116	0.093	0.095	0.090	0.133	0.090	0.101	0.140	0.198	0.279	0.160	0.096	0.102	0.098	0.190	0.424	1.310	3.022
179	2.660	4.019	4.258	3.682	2.668	0.561	0.118	0.093	0.096	0.091	0.135	0.091	0.101	0.143	0.202	0.285	0.162	0.097	0.101	0.099	0.194	0.433	1.332	3.064
180	2.628	3.978	4.216	3.642	2.636	0.553	0.118	0.094	0.096	0.092	0.134	0.092	0.102	0.142	0.200	0.282	0.161	0.097	0.103	0.099	0.192	0.427	1.315	3.029
181	3.476	5.080	5.344	4.711	3.492	0.805	0.153	0.103	0.110	0.090	0.182	0.092	0.122	0.196	0.290	0.414	0.228	0.112	0.077	0.116	0.276	0.625	1.823	3.963
182	3.477	5.081	5.345	4.712	3.492	0.805	0.153	0.103	0.110	0.090	0.182	0.092	0.122	0.196	0.290	0.414	0.228	0.112	0.077	0.116	0.277	0.625	1.823	3.963
183	3.477	5.081	5.344	4.712	3.492	0.805	0.153	0.103	0.110	0.090	0.182	0.092	0.122	0.196	0.290	0.414	0.228	0.112	0.077	0.116	0.277	0.625	1.823	3.963
184	3.478	5.082	5.346	4.713	3.493	0.805	0.153	0.103	0.110	0.090	0.182	0.092	0.122	0.196	0.290	0.414	0.228	0.112	0.077	0.116	0.277	0.626	1.824	3.964
185	3.465	5.066	5.329	4.697	3.480	0.801	0.152	0.103	0.109	0.089	0.181	0.091	0.122	0.195	0.288	0.412	0.227	0.111	0.077	0.115	0.275	0.622	1.816	3.950
186	3.493	5.101	5.365	4.731	3.508	0.810	0.154	0.104	0.110	0.090	0.183	0.092	0.123	0.197	0.292	0.416	0.230	0.112	0.077	0.116	0.278	0.629	1.833	3.980
187	3.505	5.118	5.382	4.748	3.520	0.814	0.155	0.104	0.111	0.090	0.184	0.092	0.123	0.198	0.293	0.419	0.231	0.113	0.077	0.117	0.280	0.633	1.841	3.994
188	3.485	5.091	5.355	4.722	3.500	0.809	0.155	0.105	0.111	0.091	0.184	0.093	0.123	0.198	0.292	0.417	0.230	0.113	0.078	0.117	0.279	0.629	1.829	3.972
189	3.462	5.061	5.325	4.693	3.476	0.802	0.154	0.104	0.111	0.091	0.183	0.093	0.123	0.196	0.289	0.413	0.228	0.113	0.078	0.117	0.276	0.623	1.816	3.947
190	3.549	5.172	5.438	4.802	3.563	0.832	0.160	0.108	0.115	0.094	0.191	0.096	0.128	0.205	0.302	0.431	0.238	0.117	0.080	0.121	0.288	0.648	1.871	4.042
191	2.646	3.992	4.228	3.657	2.655	0.563	0.125	0.100	0.103	0.098	0.141	0.098	0.109	0.149	0.207	0.290	0.168	0.104	0.109	0.106	0.200	0.437	1.328	3.047
192	2.647	3.993	4.229	3.658	2.655	0.564	0.125	0.100	0.103	0.098	0.141	0.098	0.109	0.149	0.207	0.290	0.168	0.104	0.109	0.106	0.200	0.437	1.329	3.048
193	2.647	3.993	4.229	3.658	2.655	0.564	0.125	0.100	0.103	0.098	0.141	0.098	0.109	0.149	0.207	0.290	0.168	0.104	0.109	0.106	0.200	0.437	1.329	3.048
194	2.647	3.993	4.230	3.658	2.656	0.564	0.125	0.100	0.103	0.098	0.141	0.098	0.109	0.149	0.207	0.290	0.168	0.104	0.109	0.106	0.200	0.437	1.329	3.048

195	2.652	4.000	4.237	3.665	2.661	0.565	0.125	0.100	0.103	0.098	0.141	0.098	0.109	0.149	0.208	0.290	0.169	0.104	0.109	0.106	0.200	0.438	1.332	3.054
196	2.666	4.018	4.255	3.683	2.675	0.569	0.125	0.100	0.103	0.098	0.142	0.098	0.109	0.150	0.209	0.292	0.170	0.104	0.108	0.107	0.201	0.442	1.340	3.069
197	2.755	4.114	4.349	3.780	2.764	0.612	0.145	0.117	0.120	0.114	0.164	0.114	0.127	0.172	0.236	0.324	0.194	0.122	0.122	0.124	0.228	0.480	1.405	3.163
198	2.605	3.902	4.128	3.581	2.612	0.587	0.159	0.135	0.138	0.133	0.175	0.133	0.143	0.183	0.240	0.320	0.202	0.139	0.143	0.141	0.232	0.464	1.330	2.992
199	2.694	4.054	4.292	3.718	2.704	0.578	0.127	0.101	0.104	0.098	0.144	0.098	0.110	0.152	0.213	0.298	0.173	0.105	0.108	0.107	0.205	0.449	1.358	3.100
200	2.689	4.047	4.284	3.710	2.698	0.577	0.127	0.102	0.104	0.099	0.144	0.099	0.110	0.152	0.212	0.297	0.172	0.106	0.109	0.108	0.205	0.448	1.354	3.094
201	1.658	2.661	2.857	2.382	1.658	0.324	0.132	0.152	0.147	0.164	0.130	0.162	0.141	0.131	0.150	0.184	0.137	0.147	0.186	0.146	0.148	0.257	0.775	1.947
202	1.658	2.661	2.857	2.382	1.658	0.324	0.132	0.152	0.147	0.164	0.130	0.162	0.141	0.131	0.150	0.184	0.137	0.147	0.186	0.146	0.148	0.257	0.775	1.947
203	1.659	2.662	2.858	2.383	1.658	0.324	0.132	0.152	0.147	0.164	0.130	0.162	0.141	0.131	0.150	0.184	0.137	0.147	0.186	0.146	0.148	0.257	0.775	1.947
204	1.656	2.658	2.854	2.379	1.655	0.324	0.133	0.152	0.148	0.164	0.130	0.162	0.142	0.131	0.150	0.184	0.137	0.148	0.187	0.146	0.148	0.257	0.774	1.944
205	1.657	2.660	2.856	2.381	1.657	0.324	0.133	0.152	0.148	0.164	0.130	0.162	0.142	0.131	0.150	0.184	0.137	0.148	0.187	0.146	0.148	0.257	0.774	1.946
206	1.658	2.661	2.856	2.382	1.657	0.324	0.133	0.152	0.148	0.164	0.130	0.162	0.142	0.131	0.150	0.184	0.137	0.148	0.187	0.146	0.148	0.257	0.774	1.946
207	1.662	2.665	2.861	2.386	1.661	0.325	0.133	0.152	0.148	0.164	0.130	0.163	0.142	0.131	0.150	0.184	0.137	0.148	0.187	0.147	0.148	0.258	0.776	1.950
208	1.676	2.686	2.883	2.406	1.676	0.328	0.131	0.150	0.146	0.162	0.130	0.160	0.140	0.131	0.150	0.185	0.137	0.146	0.184	0.145	0.148	0.260	0.784	1.967
209	1.649	2.646	2.842	2.368	1.648	0.323	0.135	0.154	0.150	0.166	0.132	0.165	0.144	0.133	0.150	0.184	0.138	0.150	0.189	0.149	0.148	0.257	0.770	1.936
210	1.683	2.694	2.891	2.414	1.682	0.330	0.132	0.150	0.146	0.162	0.131	0.160	0.140	0.132	0.151	0.187	0.137	0.146	0.184	0.145	0.149	0.261	0.788	1.974
211	1.092	1.810	1.964	1.591	1.086	0.266	0.235	0.266	0.260	0.281	0.224	0.279	0.251	0.220	0.204	0.205	0.213	0.259	0.307	0.257	0.207	0.235	0.519	1.291
212	1.092	1.810	1.963	1.590	1.085	0.266	0.235	0.266	0.260	0.281	0.224	0.279	0.251	0.220	0.204	0.205	0.213	0.259	0.307	0.257	0.207	0.235	0.519	1.291
213	1.092	1.810	1.964	1.591	1.086	0.266	0.235	0.266	0.260	0.281	0.224	0.279	0.251	0.220	0.204	0.205	0.213	0.259	0.307	0.257	0.207	0.235	0.519	1.291
214	1.092	1.810	1.964	1.591	1.086	0.266	0.234	0.265	0.259	0.281	0.224	0.279	0.251	0.220	0.204	0.205	0.213	0.259	0.307	0.257	0.207	0.235	0.519	1.291
215	1.090	1.807	1.960	1.588	1.084	0.266	0.235	0.266	0.260	0.282	0.224	0.279	0.251	0.220	0.205	0.206	0.213	0.260	0.308	0.257	0.208	0.235	0.518	1.289
216	1.093	1.811	1.965	1.592	1.086	0.266	0.234	0.265	0.259	0.281	0.223	0.278	0.250	0.219	0.204	0.205	0.213	0.259	0.307	0.257	0.207	0.235	0.519	1.292
217	1.096	1.817	1.971	1.597	1.090	0.267	0.233	0.264	0.258	0.279	0.222	0.277	0.249	0.218	0.203	0.205	0.211	0.257	0.305	0.255	0.206	0.235	0.521	1.296
218	1.093	1.811	1.965	1.592	1.086	0.267	0.235	0.266	0.260	0.281	0.224	0.279	0.251	0.220	0.205	0.206	0.213	0.259	0.307	0.257	0.208	0.235	0.519	1.292
219	1.127	1.864	2.020	1.641	1.121	0.270	0.228	0.258	0.252	0.273	0.217	0.271	0.244	0.214	0.200	0.204	0.207	0.252	0.299	0.250	0.203	0.236	0.535	1.332
220	1.099	1.818	1.971	1.598	1.092	0.269	0.236	0.267	0.261	0.282	0.225	0.280	0.252	0.221	0.206	0.208	0.215	0.260	0.308	0.258	0.209	0.238	0.524	1.299
221	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.428	0.450	0.383	0.448	0.417	0.378	0.349	0.327	0.366	0.426	0.476	0.424	0.353	0.308	0.370	0.739
222	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.428	0.450	0.383	0.448	0.418	0.378	0.349	0.327	0.366	0.426	0.476	0.424	0.353	0.308	0.370	0.739

223	0.633	1.039	1.139	0.900	0.620	0.302	0.398	0.434	0.427	0.450	0.383	0.448	0.417	0.378	0.349	0.326	0.366	0.426	0.476	0.423	0.353	0.308	0.370	0.739
224	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.428	0.450	0.383	0.448	0.418	0.378	0.349	0.327	0.366	0.427	0.476	0.424	0.353	0.308	0.370	0.738
225	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.427	0.450	0.383	0.448	0.417	0.378	0.349	0.326	0.366	0.426	0.476	0.423	0.353	0.308	0.370	0.739
226	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.428	0.451	0.384	0.448	0.418	0.378	0.349	0.327	0.366	0.427	0.476	0.424	0.353	0.308	0.370	0.739
227	0.633	1.039	1.138	0.900	0.620	0.302	0.398	0.434	0.428	0.451	0.384	0.448	0.418	0.378	0.349	0.327	0.366	0.427	0.476	0.424	0.353	0.308	0.370	0.738
228	0.636	1.046	1.146	0.906	0.624	0.301	0.396	0.432	0.425	0.448	0.381	0.446	0.415	0.375	0.347	0.325	0.364	0.424	0.474	0.421	0.351	0.306	0.371	0.743
229	0.631	1.035	1.133	0.897	0.619	0.304	0.400	0.436	0.430	0.453	0.386	0.450	0.420	0.380	0.352	0.329	0.368	0.429	0.478	0.426	0.355	0.310	0.372	0.736
230	0.638	1.048	1.148	0.909	0.626	0.302	0.396	0.432	0.426	0.448	0.381	0.446	0.416	0.376	0.347	0.325	0.364	0.424	0.474	0.422	0.351	0.307	0.373	0.745
231	0.524	0.633	0.669	0.592	0.508	0.562	0.665	0.691	0.687	0.702	0.654	0.700	0.679	0.650	0.627	0.605	0.640	0.685	0.718	0.683	0.628	0.576	0.513	0.546
232	0.524	0.633	0.669	0.592	0.508	0.562	0.665	0.691	0.687	0.703	0.655	0.701	0.680	0.650	0.627	0.606	0.641	0.685	0.719	0.683	0.628	0.577	0.513	0.546
233	0.524	0.633	0.669	0.592	0.508	0.562	0.665	0.691	0.687	0.702	0.654	0.700	0.679	0.650	0.627	0.605	0.640	0.685	0.718	0.682	0.628	0.576	0.513	0.546
234	0.524	0.633	0.669	0.592	0.508	0.562	0.665	0.691	0.687	0.702	0.654	0.700	0.680	0.650	0.627	0.605	0.640	0.685	0.719	0.683	0.628	0.576	0.513	0.546
235	0.525	0.632	0.667	0.592	0.508	0.565	0.668	0.694	0.689	0.705	0.657	0.703	0.682	0.653	0.630	0.608	0.643	0.688	0.721	0.685	0.631	0.579	0.516	0.546
236	0.524	0.634	0.671	0.593	0.507	0.560	0.663	0.690	0.685	0.701	0.653	0.699	0.678	0.649	0.625	0.604	0.639	0.684	0.717	0.681	0.626	0.575	0.512	0.546
237	0.525	0.632	0.667	0.592	0.509	0.565	0.668	0.694	0.689	0.705	0.657	0.703	0.682	0.653	0.630	0.608	0.643	0.687	0.721	0.685	0.631	0.579	0.516	0.546
238	0.525	0.643	0.681	0.599	0.508	0.552	0.656	0.682	0.678	0.694	0.645	0.692	0.670	0.641	0.617	0.595	0.631	0.676	0.710	0.674	0.618	0.566	0.505	0.549
239	0.528	0.642	0.679	0.599	0.512	0.559	0.662	0.688	0.683	0.699	0.651	0.697	0.676	0.647	0.623	0.602	0.637	0.682	0.715	0.679	0.624	0.573	0.512	0.551
240	0.556	0.693	0.735	0.642	0.541	0.545	0.644	0.670	0.666	0.682	0.633	0.680	0.658	0.628	0.605	0.584	0.619	0.664	0.699	0.662	0.607	0.558	0.510	0.586

Table 19: Fitness values of all DGs at each scenario (APSO)

Fitness values (APSO)																								
DGs	***S 1***	***S 2***	***S 3***	***S 4***	***S 5***	***S 6***	***S 7***	***S 8***	***S 9***	***S 10***	***S 11***	***S 12***	***S 13***	***S 14***	***S 15***	***S 16***	***S 17***	***S 18***	***S 19***	***S 20***	***S 21***	***S 22***	***S 23***	***S 24***
1	0.053	0.129	0.177	0.078	0.242	0.291	0.535	0.578	0.570	0.483	0.516	0.588	0.551	0.508	0.449	0.119	0.490	0.561	0.622	0.557	0.461	0.346	0.153	0.055
2	0.053	0.129	0.176	0.078	0.242	0.292	0.536	0.578	0.570	0.483	0.516	0.588	0.551	0.508	0.449	0.119	0.490	0.562	0.623	0.557	0.462	0.347	0.153	0.054
3	0.053	0.128	0.176	0.078	0.242	0.292	0.536	0.579	0.571	0.483	0.516	0.588	0.552	0.508	0.449	0.118	0.490	0.562	0.623	0.558	0.462	0.347	0.154	0.054
4	0.053	0.129	0.177	0.079	0.242	0.291	0.535	0.577	0.570	0.482	0.515	0.587	0.551	0.507	0.448	0.120	0.489	0.561	0.622	0.556	0.461	0.346	0.153	0.055
5	0.054	0.127	0.175	0.077	0.241	0.295	0.538	0.580	0.573	0.485	0.519	0.590	0.554	0.511	0.452	0.116	0.493	0.564	0.625	0.560	0.464	0.350	0.156	0.055
6	0.055	0.133	0.182	0.082	0.241	0.289	0.533	0.575	0.568	0.480	0.513	0.585	0.549	0.505	0.446	0.122	0.487	0.559	0.620	0.554	0.459	0.344	0.152	0.057

7	0.057	0.140	0.189	0.087	0.238	0.286	0.530	0.572	0.565	0.477	0.510	0.582	0.546	0.502	0.443	0.125	0.484	0.556	0.617	0.551	0.455	0.341	0.152	0.061
8	0.062	0.138	0.186	0.089	0.234	0.296	0.537	0.579	0.571	0.484	0.518	0.589	0.553	0.510	0.451	0.116	0.492	0.563	0.623	0.558	0.463	0.350	0.161	0.063
9	0.098	0.160	0.203	0.117	0.234	0.332	0.563	0.603	0.595	0.506	0.545	0.612	0.577	0.537	0.481	0.138	0.520	0.587	0.644	0.582	0.493	0.384	0.202	0.096
10	0.144	0.201	0.242	0.163	0.261	0.363	0.581	0.619	0.612	0.522	0.564	0.627	0.594	0.557	0.503	0.144	0.541	0.603	0.658	0.599	0.515	0.413	0.242	0.142
11	0.155	0.034	0.034	0.058	0.157	0.563	0.765	0.793	0.788	0.692	0.752	0.798	0.773	0.746	0.700	0.212	0.733	0.780	0.821	0.776	0.709	0.614	0.401	0.102
12	0.155	0.034	0.034	0.058	0.157	0.563	0.765	0.793	0.788	0.692	0.752	0.798	0.773	0.746	0.700	0.212	0.733	0.779	0.821	0.776	0.709	0.614	0.401	0.102
13	0.155	0.034	0.034	0.058	0.157	0.562	0.765	0.793	0.788	0.692	0.752	0.798	0.773	0.746	0.700	0.212	0.732	0.779	0.821	0.776	0.709	0.613	0.401	0.102
14	0.158	0.034	0.033	0.059	0.154	0.567	0.768	0.796	0.791	0.695	0.755	0.801	0.776	0.750	0.703	0.216	0.736	0.783	0.824	0.779	0.712	0.617	0.405	0.104
15	0.160	0.035	0.034	0.060	0.152	0.568	0.770	0.798	0.793	0.696	0.756	0.802	0.778	0.751	0.705	0.217	0.737	0.784	0.825	0.780	0.714	0.619	0.407	0.106
16	0.165	0.042	0.042	0.068	0.153	0.569	0.769	0.796	0.792	0.695	0.756	0.801	0.777	0.750	0.704	0.217	0.737	0.783	0.824	0.779	0.713	0.619	0.409	0.112
17	0.186	0.048	0.045	0.079	0.133	0.593	0.787	0.814	0.809	0.711	0.775	0.817	0.794	0.769	0.725	0.239	0.756	0.800	0.840	0.797	0.734	0.642	0.434	0.130
18	0.174	0.056	0.057	0.079	0.149	0.569	0.767	0.795	0.790	0.693	0.754	0.799	0.775	0.749	0.703	0.216	0.735	0.781	0.823	0.777	0.712	0.619	0.412	0.123
19	0.229	0.075	0.067	0.115	0.166	0.635	0.817	0.840	0.836	0.737	0.805	0.843	0.822	0.801	0.759	0.276	0.789	0.827	0.863	0.824	0.767	0.682	0.483	0.169
20	0.236	0.108	0.105	0.139	0.189	0.612	0.793	0.818	0.814	0.715	0.782	0.821	0.799	0.777	0.735	0.252	0.765	0.804	0.842	0.801	0.743	0.658	0.468	0.183
21	0.201	0.036	0.025	0.077	0.116	0.631	0.819	0.843	0.839	0.740	0.807	0.846	0.825	0.803	0.760	0.276	0.790	0.830	0.867	0.827	0.768	0.680	0.470	0.135
22	0.201	0.036	0.025	0.077	0.116	0.631	0.819	0.843	0.839	0.740	0.807	0.846	0.825	0.802	0.760	0.276	0.790	0.830	0.867	0.826	0.768	0.680	0.470	0.134
23	0.201	0.036	0.025	0.077	0.116	0.631	0.819	0.843	0.839	0.740	0.808	0.846	0.825	0.803	0.760	0.276	0.791	0.830	0.867	0.827	0.768	0.680	0.470	0.135
24	0.201	0.036	0.026	0.077	0.116	0.631	0.819	0.843	0.839	0.740	0.807	0.846	0.825	0.803	0.760	0.276	0.790	0.830	0.867	0.827	0.768	0.680	0.470	0.135
25	0.201	0.036	0.026	0.077	0.116	0.631	0.819	0.843	0.839	0.740	0.808	0.846	0.825	0.803	0.760	0.276	0.791	0.830	0.867	0.827	0.768	0.680	0.470	0.135
26	0.200	0.036	0.026	0.077	0.117	0.630	0.818	0.842	0.838	0.739	0.807	0.845	0.824	0.802	0.759	0.275	0.789	0.829	0.866	0.826	0.767	0.679	0.469	0.134
27	0.196	0.035	0.027	0.075	0.121	0.623	0.813	0.837	0.833	0.734	0.801	0.840	0.819	0.796	0.753	0.268	0.784	0.824	0.861	0.820	0.761	0.672	0.462	0.131
28	0.215	0.040	0.028	0.085	0.102	0.647	0.831	0.854	0.850	0.751	0.820	0.857	0.836	0.815	0.773	0.290	0.803	0.841	0.877	0.838	0.781	0.695	0.486	0.147
29	0.215	0.043	0.031	0.087	0.104	0.644	0.828	0.852	0.847	0.748	0.817	0.854	0.834	0.812	0.770	0.287	0.800	0.839	0.875	0.835	0.778	0.692	0.484	0.148
30	0.214	0.051	0.041	0.091	0.093	0.633	0.819	0.843	0.839	0.740	0.807	0.846	0.825	0.803	0.760	0.276	0.791	0.830	0.867	0.827	0.769	0.681	0.475	0.150
31	0.057	0.026	0.050	0.014	0.240	0.415	0.648	0.685	0.678	0.587	0.631	0.692	0.661	0.624	0.570	0.075	0.608	0.669	0.722	0.665	0.580	0.470	0.252	0.029
32	0.057	0.026	0.050	0.014	0.240	0.415	0.648	0.685	0.678	0.587	0.631	0.692	0.661	0.624	0.570	0.075	0.608	0.670	0.722	0.665	0.581	0.470	0.252	0.029
33	0.057	0.026	0.050	0.014	0.240	0.415	0.648	0.685	0.678	0.587	0.631	0.692	0.661	0.624	0.570	0.075	0.608	0.669	0.722	0.665	0.580	0.470	0.252	0.029
34	0.057	0.026	0.050	0.014	0.240	0.415	0.649	0.685	0.679	0.587	0.631	0.693	0.661	0.624	0.570	0.075	0.608	0.670	0.722	0.666	0.581	0.470	0.252	0.029

35	0.057	0.026	0.049	0.014	0.240	0.415	0.649	0.685	0.679	0.587	0.632	0.693	0.661	0.625	0.570	0.075	0.608	0.670	0.722	0.666	0.581	0.470	0.253	0.029
36	0.055	0.029	0.054	0.015	0.243	0.407	0.642	0.679	0.673	0.581	0.625	0.687	0.655	0.618	0.563	0.068	0.601	0.664	0.717	0.659	0.574	0.463	0.246	0.028
37	0.063	0.027	0.049	0.018	0.234	0.424	0.655	0.691	0.685	0.593	0.638	0.699	0.668	0.631	0.577	0.086	0.615	0.676	0.728	0.672	0.588	0.479	0.261	0.034
38	0.070	0.045	0.069	0.030	0.226	0.414	0.645	0.682	0.675	0.584	0.628	0.689	0.658	0.621	0.567	0.078	0.605	0.666	0.719	0.662	0.578	0.469	0.256	0.043
39	0.094	0.047	0.066	0.042	0.202	0.450	0.674	0.708	0.702	0.609	0.658	0.715	0.685	0.651	0.599	0.106	0.635	0.693	0.743	0.689	0.609	0.504	0.292	0.062
40	0.276	0.294	0.320	0.274	0.290	0.483	0.665	0.695	0.689	0.594	0.651	0.700	0.673	0.645	0.599	0.116	0.632	0.681	0.727	0.677	0.610	0.527	0.384	0.266
41	0.026	0.122	0.175	0.064	0.270	0.257	0.508	0.552	0.545	0.458	0.488	0.563	0.525	0.479	0.419	0.104	0.461	0.536	0.599	0.531	0.431	0.313	0.117	0.032
42	0.026	0.122	0.175	0.064	0.270	0.257	0.508	0.552	0.545	0.458	0.488	0.563	0.525	0.479	0.419	0.104	0.461	0.536	0.599	0.531	0.431	0.313	0.117	0.032
43	0.026	0.121	0.175	0.064	0.270	0.257	0.508	0.553	0.545	0.458	0.488	0.563	0.525	0.480	0.419	0.104	0.461	0.536	0.599	0.531	0.431	0.313	0.117	0.032
44	0.026	0.122	0.176	0.065	0.270	0.256	0.507	0.552	0.544	0.457	0.487	0.562	0.524	0.479	0.418	0.105	0.460	0.535	0.598	0.530	0.430	0.312	0.116	0.032
45	0.027	0.118	0.170	0.062	0.270	0.262	0.513	0.557	0.549	0.462	0.493	0.567	0.530	0.484	0.424	0.099	0.466	0.540	0.603	0.535	0.436	0.318	0.121	0.031
46	0.027	0.119	0.171	0.062	0.270	0.261	0.512	0.556	0.548	0.461	0.491	0.566	0.528	0.483	0.422	0.100	0.464	0.539	0.602	0.534	0.435	0.317	0.120	0.032
47	0.027	0.125	0.179	0.067	0.269	0.255	0.506	0.550	0.542	0.456	0.486	0.561	0.523	0.477	0.416	0.106	0.458	0.534	0.597	0.529	0.429	0.311	0.116	0.034
48	0.030	0.124	0.177	0.067	0.267	0.260	0.510	0.554	0.546	0.460	0.490	0.565	0.527	0.481	0.421	0.102	0.463	0.537	0.600	0.533	0.433	0.315	0.121	0.035
49	0.046	0.131	0.181	0.077	0.251	0.279	0.525	0.568	0.560	0.473	0.505	0.578	0.541	0.497	0.438	0.097	0.479	0.552	0.613	0.547	0.450	0.335	0.142	0.050
50	0.060	0.147	0.198	0.093	0.236	0.283	0.526	0.569	0.561	0.474	0.506	0.579	0.542	0.498	0.439	0.125	0.480	0.552	0.614	0.548	0.452	0.338	0.151	0.065
51	0.464	1.043	1.191	0.842	0.175	0.033	0.160	0.209	0.200	0.119	0.140	0.223	0.179	0.131	0.076	0.412	0.115	0.192	0.268	0.188	0.091	0.031	0.113	0.611
52	0.464	1.043	1.191	0.842	0.175	0.033	0.160	0.209	0.200	0.119	0.140	0.224	0.179	0.131	0.076	0.412	0.115	0.192	0.268	0.188	0.091	0.031	0.113	0.611
53	0.464	1.043	1.191	0.842	0.175	0.033	0.160	0.209	0.200	0.119	0.140	0.223	0.179	0.131	0.076	0.412	0.115	0.192	0.268	0.188	0.090	0.031	0.113	0.611
54	0.465	1.046	1.194	0.844	0.177	0.033	0.160	0.209	0.200	0.118	0.139	0.223	0.179	0.131	0.075	0.412	0.114	0.192	0.267	0.187	0.090	0.030	0.114	0.613
55	0.466	1.046	1.194	0.845	0.178	0.033	0.160	0.209	0.200	0.118	0.139	0.223	0.179	0.131	0.076	0.412	0.114	0.192	0.268	0.188	0.090	0.031	0.114	0.614
56	0.466	1.046	1.194	0.845	0.178	0.033	0.161	0.209	0.200	0.119	0.140	0.224	0.179	0.131	0.076	0.411	0.115	0.192	0.268	0.188	0.091	0.031	0.114	0.614
57	0.474	1.059	1.208	0.857	0.186	0.034	0.159	0.207	0.198	0.117	0.138	0.221	0.177	0.130	0.075	0.412	0.113	0.190	0.266	0.186	0.089	0.032	0.118	0.624
58	0.493	1.090	1.240	0.885	0.205	0.032	0.153	0.201	0.192	0.111	0.133	0.215	0.171	0.124	0.070	0.414	0.108	0.184	0.260	0.180	0.084	0.031	0.126	0.646
59	0.530	1.133	1.284	0.931	0.241	0.046	0.160	0.206	0.197	0.113	0.141	0.218	0.177	0.134	0.083	0.399	0.118	0.189	0.261	0.184	0.096	0.046	0.154	0.685
60	0.551	1.156	1.305	0.953	0.271	0.050	0.165	0.210	0.201	0.118	0.147	0.223	0.182	0.139	0.089	0.392	0.124	0.193	0.265	0.189	0.103	0.055	0.167	0.707
61	1.735	2.889	3.118	2.574	1.459	0.200	0.007	0.014	0.009	0.086	0.009	0.021	0.004	0.010	0.016	0.398	0.016	0.003	0.054	0.003	0.022	0.140	0.733	2.064
62	1.734	2.888	3.117	2.573	1.458	0.200	0.007	0.014	0.009	0.086	0.009	0.021	0.004	0.010	0.016	0.398	0.016	0.003	0.054	0.003	0.022	0.140	0.732	2.063

63	1.734	2.888	3.116	2.572	1.458	0.200	0.007	0.014	0.009	0.086	0.009	0.021	0.004	0.010	0.016	0.398	0.016	0.003	0.054	0.003	0.022	0.140	0.732	2.063
64	1.735	2.890	3.118	2.574	1.459	0.200	0.007	0.014	0.009	0.086	0.009	0.021	0.004	0.010	0.016	0.398	0.016	0.003	0.054	0.003	0.022	0.140	0.733	2.064
65	1.733	2.887	3.116	2.572	1.457	0.200	0.007	0.014	0.009	0.086	0.009	0.020	0.004	0.010	0.016	0.399	0.016	0.003	0.054	0.003	0.022	0.140	0.732	2.062
66	1.739	2.895	3.124	2.580	1.463	0.201	0.007	0.014	0.009	0.086	0.009	0.020	0.004	0.011	0.016	0.398	0.016	0.004	0.053	0.003	0.022	0.141	0.735	2.068
67	1.715	2.863	3.090	2.548	1.439	0.196	0.007	0.016	0.011	0.084	0.009	0.022	0.004	0.010	0.015	0.400	0.015	0.005	0.055	0.004	0.021	0.137	0.722	2.042
68	1.707	2.851	3.079	2.538	1.430	0.195	0.009	0.016	0.012	0.084	0.010	0.022	0.005	0.012	0.016	0.399	0.016	0.005	0.056	0.005	0.022	0.137	0.719	2.032
69	1.770	2.935	3.164	2.618	1.494	0.211	0.009	0.015	0.011	0.085	0.012	0.021	0.005	0.014	0.021	0.392	0.019	0.006	0.053	0.005	0.026	0.149	0.754	2.102
70	1.786	2.953	3.183	2.637	1.508	0.220	0.014	0.017	0.014	0.085	0.016	0.021	0.008	0.018	0.026	0.385	0.024	0.009	0.052	0.009	0.032	0.156	0.768	2.119
71	2.256	3.584	3.832	3.242	1.985	0.334	0.012	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.054	0.335	0.040	0.007	0.020	0.007	0.057	0.243	1.033	2.641
72	2.254	3.582	3.830	3.240	1.984	0.334	0.012	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.054	0.335	0.040	0.007	0.020	0.007	0.057	0.242	1.032	2.640
73	2.256	3.585	3.833	3.243	1.985	0.334	0.012	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.054	0.335	0.040	0.007	0.020	0.007	0.057	0.243	1.033	2.642
74	2.257	3.585	3.834	3.243	1.986	0.334	0.012	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.054	0.335	0.040	0.007	0.020	0.007	0.057	0.243	1.034	2.643
75	2.256	3.585	3.833	3.243	1.985	0.334	0.012	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.054	0.335	0.040	0.007	0.020	0.007	0.057	0.243	1.033	2.642
76	2.268	3.599	3.848	3.257	1.997	0.337	0.013	0.004	0.004	0.112	0.022	0.006	0.006	0.027	0.055	0.333	0.040	0.007	0.019	0.006	0.058	0.245	1.040	2.654
77	2.269	3.602	3.851	3.259	1.999	0.338	0.013	0.004	0.004	0.112	0.022	0.005	0.006	0.028	0.055	0.333	0.041	0.006	0.019	0.006	0.058	0.246	1.041	2.657
78	2.231	3.551	3.799	3.210	1.960	0.328	0.012	0.004	0.004	0.110	0.021	0.005	0.006	0.026	0.052	0.338	0.039	0.006	0.022	0.006	0.055	0.238	1.019	2.614
79	2.308	3.651	3.901	3.307	2.038	0.350	0.015	0.004	0.005	0.111	0.025	0.005	0.006	0.031	0.060	0.326	0.044	0.006	0.019	0.006	0.062	0.255	1.065	2.699
80	2.327	3.677	3.927	3.333	2.056	0.357	0.017	0.005	0.005	0.110	0.027	0.005	0.004	0.033	0.063	0.322	0.047	0.004	0.018	0.004	0.065	0.261	1.077	2.720
81	2.151	3.447	3.692	3.110	1.880	0.304	0.009	0.004	0.004	0.109	0.016	0.003	0.007	0.021	0.043	0.350	0.032	0.007	0.025	0.007	0.047	0.219	0.971	2.526
82	2.152	3.449	3.694	3.111	1.881	0.305	0.009	0.004	0.004	0.109	0.016	0.003	0.007	0.021	0.044	0.350	0.032	0.007	0.025	0.007	0.047	0.220	0.972	2.527
83	2.149	3.444	3.688	3.106	1.877	0.304	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.021	0.043	0.351	0.032	0.007	0.025	0.007	0.047	0.219	0.969	2.523
84	2.149	3.444	3.689	3.106	1.877	0.304	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.021	0.043	0.351	0.032	0.007	0.025	0.007	0.047	0.219	0.969	2.523
85	2.155	3.452	3.698	3.115	1.884	0.305	0.009	0.004	0.004	0.110	0.017	0.004	0.007	0.021	0.044	0.350	0.032	0.007	0.025	0.007	0.047	0.220	0.973	2.530
86	2.140	3.433	3.678	3.096	1.869	0.301	0.008	0.003	0.004	0.109	0.016	0.003	0.007	0.020	0.043	0.352	0.031	0.007	0.025	0.007	0.046	0.217	0.965	2.514
87	2.139	3.430	3.675	3.094	1.867	0.301	0.009	0.004	0.004	0.108	0.016	0.004	0.007	0.021	0.043	0.352	0.032	0.007	0.026	0.007	0.046	0.217	0.964	2.512
88	2.173	3.474	3.720	3.136	1.901	0.311	0.010	0.003	0.004	0.109	0.018	0.003	0.006	0.023	0.046	0.347	0.034	0.006	0.025	0.007	0.049	0.225	0.984	2.549
89	2.187	3.490	3.735	3.152	1.915	0.318	0.013	0.005	0.005	0.107	0.021	0.005	0.006	0.026	0.050	0.342	0.038	0.006	0.026	0.006	0.053	0.230	0.994	2.564
90	2.196	3.499	3.743	3.160	1.925	0.322	0.015	0.009	0.008	0.103	0.023	0.010	0.007	0.028	0.053	0.339	0.040	0.008	0.030	0.008	0.056	0.235	1.000	2.574

91	2.529	3.940	4.196	3.587	2.260	0.415	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.083	0.292	0.061	0.004	0.009	0.004	0.084	0.306	1.197	2.942
92	2.529	3.940	4.197	3.587	2.261	0.415	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.083	0.292	0.061	0.004	0.009	0.004	0.084	0.306	1.197	2.943
93	2.529	3.939	4.196	3.586	2.260	0.415	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.083	0.292	0.061	0.004	0.010	0.004	0.084	0.306	1.196	2.942
94	2.530	3.940	4.197	3.587	2.261	0.415	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.083	0.292	0.061	0.004	0.009	0.004	0.084	0.306	1.197	2.943
95	2.525	3.935	4.191	3.582	2.257	0.414	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.082	0.293	0.061	0.004	0.010	0.004	0.084	0.305	1.194	2.938
96	2.529	3.939	4.196	3.586	2.260	0.415	0.024	0.004	0.005	0.112	0.037	0.004	0.004	0.044	0.083	0.292	0.061	0.004	0.010	0.004	0.084	0.306	1.196	2.942
97	2.535	3.947	4.204	3.594	2.266	0.416	0.024	0.005	0.005	0.112	0.038	0.004	0.004	0.045	0.083	0.291	0.062	0.004	0.010	0.004	0.085	0.307	1.200	2.949
98	2.535	3.947	4.203	3.593	2.266	0.417	0.024	0.004	0.005	0.112	0.038	0.004	0.004	0.045	0.084	0.291	0.062	0.004	0.010	0.004	0.085	0.307	1.200	2.949
99	2.503	3.906	4.162	3.554	2.234	0.408	0.023	0.005	0.005	0.112	0.037	0.004	0.004	0.043	0.081	0.296	0.060	0.004	0.010	0.004	0.082	0.300	1.182	2.914
100	2.500	3.877	4.126	3.532	2.230	0.429	0.047	0.028	0.029	0.124	0.060	0.027	0.028	0.067	0.104	0.282	0.083	0.027	0.033	0.027	0.106	0.322	1.195	2.904
101	1.559	2.650	2.871	2.345	1.283	0.157	0.008	0.029	0.023	0.070	0.008	0.036	0.008	0.008	0.010	0.417	0.010	0.016	0.072	0.014	0.013	0.108	0.634	1.867
102	1.560	2.650	2.871	2.345	1.284	0.157	0.008	0.029	0.023	0.070	0.008	0.036	0.008	0.008	0.010	0.417	0.010	0.016	0.072	0.014	0.013	0.108	0.634	1.868
103	1.559	2.650	2.871	2.345	1.283	0.157	0.008	0.029	0.023	0.070	0.008	0.036	0.008	0.008	0.010	0.417	0.010	0.016	0.072	0.014	0.013	0.108	0.634	1.868
104	1.562	2.654	2.875	2.348	1.286	0.158	0.008	0.029	0.023	0.071	0.008	0.036	0.008	0.008	0.010	0.417	0.010	0.016	0.072	0.014	0.013	0.109	0.636	1.870
105	1.548	2.635	2.856	2.330	1.272	0.155	0.009	0.029	0.023	0.070	0.008	0.037	0.009	0.008	0.010	0.418	0.010	0.017	0.073	0.014	0.013	0.106	0.628	1.855
106	1.565	2.657	2.878	2.352	1.289	0.159	0.008	0.028	0.023	0.070	0.008	0.036	0.008	0.008	0.010	0.417	0.011	0.016	0.072	0.014	0.013	0.109	0.637	1.874
107	1.574	2.669	2.890	2.363	1.298	0.162	0.009	0.029	0.023	0.070	0.008	0.036	0.008	0.009	0.012	0.415	0.011	0.016	0.071	0.014	0.014	0.112	0.643	1.883
108	1.571	2.665	2.886	2.359	1.295	0.162	0.010	0.029	0.023	0.070	0.009	0.037	0.009	0.009	0.012	0.415	0.012	0.017	0.072	0.014	0.015	0.112	0.642	1.880
109	1.598	2.700	2.922	2.393	1.323	0.170	0.010	0.029	0.023	0.070	0.010	0.036	0.010	0.011	0.015	0.410	0.014	0.017	0.071	0.014	0.017	0.118	0.658	1.910
110	1.644	2.758	2.981	2.450	1.367	0.184	0.013	0.029	0.024	0.070	0.013	0.036	0.011	0.014	0.020	0.402	0.018	0.018	0.070	0.016	0.023	0.130	0.686	1.960
111	2.472	3.843	4.093	3.499	2.203	0.417	0.043	0.026	0.026	0.126	0.055	0.029	0.027	0.062	0.098	0.295	0.078	0.028	0.033	0.028	0.100	0.313	1.176	2.874
112	2.472	3.843	4.093	3.498	2.202	0.417	0.042	0.026	0.026	0.126	0.055	0.029	0.027	0.062	0.098	0.295	0.078	0.028	0.033	0.028	0.100	0.313	1.175	2.874
113	2.464	3.832	4.082	3.488	2.194	0.415	0.042	0.026	0.026	0.126	0.055	0.029	0.027	0.061	0.097	0.296	0.077	0.029	0.033	0.028	0.099	0.311	1.171	2.865
114	2.473	3.845	4.095	3.501	2.204	0.418	0.043	0.026	0.026	0.126	0.055	0.029	0.027	0.062	0.098	0.295	0.078	0.028	0.033	0.028	0.100	0.313	1.176	2.876
115	2.465	3.835	4.084	3.490	2.196	0.416	0.042	0.026	0.026	0.126	0.055	0.029	0.027	0.061	0.097	0.296	0.077	0.028	0.033	0.028	0.099	0.311	1.172	2.866
116	2.513	3.895	4.146	3.549	2.244	0.430	0.045	0.026	0.027	0.126	0.058	0.029	0.026	0.065	0.102	0.288	0.081	0.027	0.033	0.027	0.104	0.323	1.200	2.919
117	2.488	3.864	4.114	3.519	2.217	0.424	0.044	0.027	0.027	0.125	0.057	0.028	0.027	0.064	0.101	0.291	0.080	0.027	0.032	0.027	0.102	0.318	1.187	2.891
118	2.396	3.740	3.987	3.400	2.125	0.400	0.044	0.028	0.029	0.122	0.055	0.029	0.028	0.061	0.094	0.303	0.076	0.028	0.038	0.028	0.096	0.300	1.133	2.789

119	2.569	3.967	4.219	3.620	2.299	0.452	0.051	0.031	0.031	0.122	0.065	0.029	0.031	0.073	0.113	0.275	0.090	0.030	0.034	0.031	0.114	0.341	1.237	2.980
120	2.920	4.412	4.672	4.056	2.652	0.570	0.079	0.046	0.049	0.110	0.099	0.040	0.052	0.109	0.166	0.266	0.132	0.048	0.040	0.050	0.164	0.438	1.458	3.363
121	1.999	3.198	3.426	2.881	1.726	0.307	0.053	0.050	0.050	0.128	0.059	0.050	0.052	0.062	0.078	0.340	0.071	0.052	0.078	0.052	0.083	0.234	0.912	2.346
122	1.999	3.198	3.426	2.881	1.725	0.307	0.053	0.050	0.050	0.128	0.059	0.050	0.052	0.062	0.078	0.340	0.071	0.052	0.078	0.052	0.083	0.234	0.912	2.346
123	1.998	3.197	3.425	2.880	1.725	0.307	0.053	0.050	0.050	0.128	0.059	0.050	0.052	0.062	0.078	0.340	0.071	0.052	0.078	0.052	0.083	0.234	0.911	2.345
124	1.998	3.196	3.424	2.879	1.724	0.307	0.053	0.050	0.050	0.128	0.059	0.050	0.052	0.062	0.078	0.340	0.071	0.051	0.079	0.052	0.083	0.233	0.911	2.344
125	2.010	3.212	3.440	2.894	1.736	0.310	0.054	0.050	0.050	0.128	0.059	0.051	0.052	0.063	0.079	0.339	0.072	0.051	0.078	0.052	0.084	0.236	0.918	2.358
126	2.031	3.239	3.468	2.920	1.757	0.316	0.054	0.050	0.050	0.128	0.060	0.050	0.051	0.064	0.081	0.335	0.073	0.051	0.078	0.051	0.086	0.241	0.930	2.381
127	2.012	3.214	3.443	2.897	1.738	0.312	0.054	0.050	0.050	0.128	0.060	0.051	0.051	0.063	0.080	0.338	0.073	0.051	0.078	0.052	0.085	0.237	0.920	2.360
128	2.104	3.332	3.563	3.011	1.831	0.340	0.059	0.052	0.052	0.127	0.066	0.051	0.054	0.070	0.091	0.322	0.081	0.053	0.077	0.054	0.095	0.259	0.975	2.461
129	2.053	3.260	3.487	2.943	1.779	0.331	0.063	0.057	0.057	0.123	0.069	0.058	0.058	0.073	0.092	0.324	0.083	0.058	0.084	0.058	0.097	0.254	0.949	2.403
130	2.199	3.433	3.661	3.114	1.926	0.386	0.082	0.072	0.073	0.136	0.091	0.071	0.074	0.096	0.120	0.343	0.108	0.073	0.095	0.074	0.124	0.301	1.045	2.560
131	1.464	2.501	2.713	2.207	1.186	0.155	0.030	0.054	0.047	0.082	0.028	0.062	0.032	0.028	0.029	0.408	0.030	0.041	0.098	0.038	0.031	0.113	0.595	1.756
132	1.464	2.501	2.713	2.207	1.186	0.155	0.030	0.054	0.047	0.082	0.028	0.062	0.032	0.028	0.029	0.408	0.030	0.041	0.098	0.038	0.031	0.113	0.595	1.756
133	1.463	2.500	2.712	2.206	1.185	0.155	0.030	0.054	0.047	0.082	0.028	0.062	0.032	0.028	0.029	0.408	0.030	0.041	0.098	0.038	0.030	0.112	0.594	1.755
134	1.463	2.500	2.712	2.206	1.185	0.155	0.030	0.053	0.047	0.082	0.028	0.062	0.032	0.028	0.029	0.408	0.029	0.041	0.098	0.038	0.030	0.112	0.594	1.755
135	1.465	2.503	2.715	2.209	1.187	0.155	0.030	0.053	0.047	0.082	0.028	0.062	0.032	0.028	0.029	0.408	0.030	0.041	0.097	0.038	0.031	0.113	0.596	1.758
136	1.462	2.500	2.711	2.206	1.184	0.155	0.031	0.053	0.047	0.082	0.029	0.061	0.033	0.028	0.029	0.408	0.030	0.041	0.097	0.038	0.031	0.113	0.594	1.754
137	1.451	2.484	2.695	2.191	1.173	0.153	0.031	0.055	0.048	0.080	0.029	0.063	0.033	0.029	0.029	0.408	0.030	0.042	0.099	0.039	0.031	0.111	0.589	1.742
138	1.440	2.467	2.677	2.175	1.162	0.152	0.034	0.057	0.051	0.078	0.031	0.066	0.037	0.031	0.030	0.407	0.032	0.044	0.102	0.042	0.032	0.111	0.584	1.729
139	1.456	2.487	2.697	2.195	1.177	0.158	0.036	0.059	0.053	0.077	0.033	0.067	0.039	0.033	0.033	0.404	0.034	0.046	0.102	0.044	0.035	0.116	0.595	1.746
140	1.540	2.596	2.809	2.300	1.261	0.184	0.040	0.059	0.054	0.078	0.038	0.066	0.040	0.039	0.042	0.389	0.041	0.047	0.100	0.045	0.044	0.137	0.646	1.838
141	1.115	2.040	2.240	1.764	0.834	0.062	0.029	0.065	0.057	0.029	0.015	0.076	0.040	0.011	0.010	0.453	0.007	0.050	0.116	0.047	0.006	0.039	0.396	1.369
142	1.115	2.041	2.240	1.764	0.834	0.062	0.029	0.065	0.057	0.029	0.015	0.076	0.040	0.011	0.010	0.453	0.007	0.050	0.116	0.047	0.006	0.039	0.396	1.370
143	1.113	2.037	2.237	1.761	0.832	0.061	0.029	0.065	0.058	0.029	0.016	0.076	0.040	0.011	0.010	0.453	0.007	0.050	0.117	0.047	0.006	0.039	0.395	1.367
144	1.113	2.038	2.238	1.762	0.832	0.061	0.029	0.065	0.057	0.029	0.015	0.076	0.040	0.011	0.010	0.453	0.007	0.050	0.117	0.047	0.006	0.039	0.395	1.367
145	1.113	2.038	2.238	1.762	0.832	0.061	0.029	0.065	0.058	0.029	0.016	0.076	0.040	0.012	0.010	0.453	0.007	0.050	0.117	0.047	0.006	0.039	0.395	1.368
146	1.113	2.037	2.237	1.761	0.832	0.061	0.029	0.065	0.058	0.029	0.016	0.076	0.040	0.012	0.010	0.453	0.007	0.050	0.117	0.047	0.006	0.039	0.395	1.367

147	1.115	2.040	2.239	1.763	0.834	0.062	0.029	0.065	0.057	0.029	0.015	0.076	0.040	0.011	0.010	0.453	0.007	0.050	0.116	0.047	0.006	0.039	0.396	1.369
148	1.099	2.017	2.216	1.742	0.817	0.059	0.030	0.067	0.059	0.028	0.017	0.078	0.041	0.012	0.010	0.453	0.007	0.052	0.118	0.048	0.006	0.037	0.388	1.351
149	1.099	2.016	2.215	1.742	0.818	0.059	0.031	0.068	0.060	0.028	0.018	0.079	0.042	0.013	0.010	0.453	0.008	0.053	0.119	0.049	0.006	0.038	0.388	1.351
150	1.108	2.029	2.227	1.753	0.827	0.062	0.031	0.068	0.060	0.029	0.018	0.079	0.042	0.014	0.009	0.451	0.009	0.053	0.119	0.049	0.007	0.040	0.394	1.361
151	0.849	1.658	1.842	1.405	0.565	0.019	0.060	0.102	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.024	0.086	0.158	0.083	0.009	0.013	0.265	1.066
152	0.849	1.658	1.841	1.404	0.565	0.019	0.060	0.102	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.024	0.086	0.158	0.083	0.009	0.013	0.265	1.066
153	0.848	1.657	1.840	1.403	0.564	0.019	0.060	0.103	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.025	0.087	0.158	0.083	0.009	0.013	0.265	1.065
154	0.848	1.657	1.840	1.403	0.564	0.019	0.060	0.103	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.024	0.087	0.158	0.083	0.009	0.013	0.265	1.065
155	0.847	1.655	1.838	1.401	0.563	0.019	0.060	0.103	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.025	0.087	0.158	0.083	0.009	0.013	0.264	1.063
156	0.850	1.659	1.843	1.406	0.566	0.019	0.060	0.102	0.094	0.010	0.043	0.115	0.075	0.037	0.007	0.459	0.025	0.086	0.158	0.083	0.009	0.013	0.266	1.067
157	0.830	1.628	1.810	1.377	0.545	0.018	0.064	0.107	0.098	0.015	0.047	0.120	0.079	0.040	0.007	0.458	0.028	0.091	0.163	0.087	0.012	0.013	0.256	1.043
158	0.861	1.671	1.855	1.417	0.577	0.023	0.063	0.105	0.096	0.012	0.046	0.117	0.077	0.040	0.007	0.457	0.028	0.089	0.160	0.085	0.012	0.016	0.272	1.079
159	0.862	1.626	1.799	1.385	0.579	0.067	0.110	0.150	0.141	0.059	0.093	0.161	0.123	0.087	0.056	0.410	0.076	0.134	0.203	0.131	0.061	0.062	0.303	1.068
160	1.717	2.747	2.948	2.474	1.439	0.317	0.137	0.148	0.145	0.049	0.136	0.151	0.134	0.136	0.141	0.518	0.138	0.138	0.177	0.136	0.142	0.259	0.815	2.011
161	1.353	2.364	2.574	2.073	1.074	0.114	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.094	0.031	0.012	0.078	0.524	1.635
162	1.353	2.364	2.574	2.072	1.074	0.114	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.094	0.031	0.012	0.078	0.524	1.635
163	1.352	2.363	2.573	2.072	1.074	0.114	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.094	0.031	0.012	0.078	0.524	1.635
164	1.354	2.365	2.575	2.073	1.075	0.115	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.014	0.432	0.011	0.034	0.094	0.031	0.012	0.078	0.524	1.636
165	1.351	2.361	2.571	2.070	1.072	0.114	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.095	0.031	0.012	0.078	0.523	1.633
166	1.354	2.366	2.576	2.074	1.075	0.115	0.018	0.047	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.094	0.031	0.012	0.078	0.525	1.637
167	1.346	2.355	2.565	2.064	1.068	0.113	0.019	0.048	0.041	0.052	0.013	0.057	0.025	0.012	0.013	0.432	0.011	0.034	0.095	0.032	0.012	0.077	0.521	1.628
168	1.367	2.383	2.594	2.091	1.089	0.118	0.019	0.047	0.040	0.053	0.013	0.056	0.024	0.012	0.015	0.430	0.012	0.033	0.093	0.030	0.013	0.081	0.532	1.651
169	1.304	2.295	2.502	2.007	1.025	0.106	0.023	0.054	0.047	0.045	0.016	0.064	0.031	0.014	0.013	0.434	0.013	0.040	0.102	0.037	0.012	0.072	0.499	1.580
170	1.381	2.400	2.611	2.108	1.102	0.123	0.020	0.047	0.040	0.053	0.015	0.056	0.025	0.014	0.015	0.427	0.014	0.034	0.093	0.031	0.014	0.085	0.541	1.666
171	2.133	3.424	3.669	3.088	1.861	0.299	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.020	0.042	0.353	0.031	0.007	0.025	0.007	0.045	0.215	0.961	2.506
172	2.133	3.424	3.669	3.087	1.861	0.299	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.020	0.042	0.353	0.031	0.007	0.025	0.007	0.045	0.215	0.961	2.506
173	2.132	3.423	3.667	3.086	1.860	0.299	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.020	0.042	0.353	0.031	0.007	0.025	0.007	0.045	0.215	0.960	2.505
174	2.132	3.423	3.667	3.086	1.860	0.299	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.020	0.042	0.353	0.031	0.007	0.025	0.007	0.045	0.215	0.960	2.505

175	2.135	3.426	3.671	3.089	1.863	0.300	0.008	0.004	0.004	0.109	0.016	0.003	0.007	0.020	0.042	0.353	0.031	0.007	0.025	0.007	0.046	0.216	0.962	2.508
176	2.122	3.409	3.653	3.073	1.850	0.296	0.008	0.004	0.004	0.109	0.015	0.003	0.007	0.020	0.041	0.354	0.030	0.007	0.026	0.007	0.045	0.213	0.954	2.494
177	2.121	3.408	3.653	3.072	1.849	0.296	0.008	0.004	0.004	0.109	0.015	0.004	0.007	0.020	0.041	0.354	0.030	0.007	0.026	0.007	0.044	0.213	0.954	2.493
178	2.119	3.405	3.649	3.069	1.847	0.296	0.008	0.004	0.004	0.109	0.016	0.004	0.007	0.020	0.041	0.354	0.031	0.007	0.026	0.007	0.045	0.213	0.953	2.490
179	2.157	3.455	3.700	3.118	1.885	0.307	0.010	0.004	0.004	0.109	0.018	0.004	0.008	0.022	0.045	0.349	0.033	0.007	0.025	0.008	0.048	0.221	0.975	2.532
180	2.126	3.413	3.658	3.078	1.853	0.300	0.010	0.004	0.005	0.107	0.017	0.005	0.008	0.021	0.043	0.352	0.032	0.008	0.027	0.008	0.046	0.216	0.958	2.497
181	2.973	4.516	4.786	4.147	2.708	0.551	0.045	0.011	0.014	0.110	0.065	0.004	0.015	0.075	0.133	0.220	0.099	0.009	0.003	0.011	0.131	0.414	1.466	3.431
182	2.974	4.517	4.787	4.148	2.709	0.551	0.045	0.011	0.014	0.109	0.065	0.004	0.015	0.075	0.133	0.220	0.099	0.009	0.003	0.011	0.131	0.414	1.466	3.432
183	2.974	4.516	4.786	4.147	2.709	0.551	0.045	0.011	0.014	0.109	0.065	0.004	0.015	0.075	0.133	0.220	0.099	0.009	0.003	0.011	0.131	0.414	1.466	3.431
184	2.975	4.518	4.788	4.149	2.710	0.552	0.045	0.011	0.014	0.109	0.065	0.004	0.015	0.075	0.133	0.220	0.099	0.009	0.003	0.011	0.131	0.414	1.467	3.433
185	2.962	4.501	4.771	4.133	2.697	0.548	0.044	0.011	0.014	0.110	0.064	0.004	0.015	0.074	0.131	0.222	0.098	0.009	0.003	0.010	0.130	0.411	1.459	3.418
186	2.990	4.537	4.807	4.167	2.725	0.556	0.046	0.011	0.015	0.109	0.066	0.004	0.016	0.077	0.135	0.217	0.100	0.009	0.003	0.011	0.133	0.418	1.476	3.449
187	3.002	4.553	4.824	4.184	2.737	0.561	0.047	0.012	0.015	0.109	0.067	0.004	0.016	0.078	0.137	0.214	0.102	0.010	0.003	0.012	0.134	0.421	1.484	3.462
188	2.982	4.526	4.797	4.157	2.716	0.555	0.046	0.012	0.016	0.108	0.067	0.005	0.016	0.077	0.135	0.217	0.101	0.010	0.004	0.012	0.133	0.417	1.472	3.440
189	2.959	4.497	4.767	4.129	2.693	0.548	0.045	0.012	0.015	0.108	0.066	0.004	0.016	0.076	0.133	0.220	0.099	0.010	0.004	0.012	0.131	0.412	1.459	3.415
190	3.046	4.608	4.880	4.238	2.780	0.578	0.052	0.016	0.020	0.105	0.074	0.006	0.021	0.085	0.146	0.203	0.109	0.014	0.006	0.016	0.143	0.436	1.514	3.510
191	2.143	3.428	3.670	3.093	1.871	0.310	0.016	0.010	0.010	0.102	0.024	0.008	0.011	0.028	0.050	0.344	0.039	0.010	0.033	0.011	0.054	0.225	0.971	2.515
192	2.144	3.429	3.671	3.094	1.872	0.310	0.016	0.010	0.010	0.102	0.024	0.008	0.011	0.028	0.050	0.344	0.039	0.010	0.033	0.011	0.054	0.226	0.972	2.516
193	2.144	3.429	3.671	3.094	1.872	0.310	0.016	0.010	0.010	0.102	0.024	0.008	0.011	0.028	0.050	0.344	0.039	0.010	0.033	0.011	0.054	0.226	0.972	2.516
194	2.144	3.429	3.672	3.094	1.872	0.310	0.016	0.010	0.010	0.102	0.024	0.008	0.011	0.028	0.050	0.344	0.039	0.010	0.033	0.011	0.054	0.226	0.972	2.516
195	2.149	3.436	3.679	3.101	1.877	0.311	0.016	0.010	0.010	0.102	0.024	0.008	0.011	0.028	0.051	0.343	0.039	0.010	0.032	0.011	0.054	0.227	0.975	2.522
196	2.164	3.454	3.697	3.118	1.892	0.315	0.017	0.010	0.010	0.102	0.025	0.008	0.011	0.029	0.052	0.341	0.040	0.011	0.032	0.011	0.056	0.230	0.983	2.538
197	2.253	3.550	3.791	3.216	1.980	0.359	0.037	0.027	0.028	0.106	0.047	0.024	0.029	0.052	0.079	0.342	0.065	0.028	0.046	0.029	0.082	0.268	1.048	2.631
198	2.102	3.337	3.570	3.016	1.828	0.333	0.051	0.045	0.045	0.127	0.058	0.043	0.046	0.062	0.083	0.333	0.073	0.045	0.066	0.045	0.087	0.252	0.973	2.460
199	2.192	3.490	3.734	3.153	1.920	0.325	0.018	0.011	0.011	0.101	0.027	0.009	0.011	0.031	0.056	0.336	0.043	0.011	0.032	0.011	0.059	0.237	1.001	2.568
200	2.186	3.482	3.726	3.146	1.915	0.323	0.019	0.011	0.011	0.101	0.027	0.012	0.011	0.032	0.056	0.336	0.043	0.011	0.033	0.011	0.059	0.236	0.997	2.562
201	1.156	2.097	2.299	1.818	0.874	0.070	0.024	0.059	0.052	0.035	0.013	0.070	0.034	0.010	0.008	0.449	0.007	0.045	0.110	0.041	0.005	0.046	0.418	1.415
202	1.156	2.097	2.299	1.818	0.874	0.070	0.024	0.059	0.052	0.035	0.013	0.070	0.034	0.010	0.008	0.449	0.007	0.045	0.110	0.041	0.005	0.046	0.418	1.415

203	1.156	2.098	2.300	1.819	0.875	0.070	0.024	0.059	0.052	0.035	0.013	0.070	0.034	0.010	0.008	0.449	0.007	0.045	0.110	0.041	0.005	0.046	0.418	1.416
204	1.153	2.094	2.296	1.815	0.872	0.070	0.024	0.060	0.052	0.035	0.013	0.070	0.035	0.010	0.008	0.449	0.007	0.045	0.110	0.042	0.005	0.045	0.417	1.412
205	1.155	2.096	2.298	1.817	0.873	0.070	0.024	0.060	0.052	0.035	0.013	0.070	0.035	0.010	0.008	0.449	0.007	0.045	0.110	0.042	0.005	0.045	0.417	1.414
206	1.155	2.096	2.298	1.817	0.874	0.070	0.024	0.060	0.052	0.035	0.013	0.070	0.035	0.010	0.008	0.449	0.007	0.045	0.110	0.042	0.005	0.046	0.417	1.415
207	1.159	2.101	2.303	1.822	0.878	0.071	0.025	0.060	0.052	0.035	0.013	0.071	0.035	0.010	0.007	0.449	0.007	0.045	0.111	0.042	0.005	0.046	0.419	1.418
208	1.174	2.122	2.325	1.842	0.892	0.074	0.023	0.058	0.050	0.037	0.013	0.068	0.033	0.010	0.007	0.448	0.007	0.043	0.108	0.040	0.005	0.048	0.427	1.435
209	1.146	2.082	2.284	1.804	0.865	0.069	0.026	0.062	0.054	0.033	0.015	0.073	0.037	0.012	0.008	0.449	0.008	0.047	0.113	0.044	0.005	0.045	0.413	1.404
210	1.180	2.130	2.333	1.849	0.899	0.076	0.024	0.058	0.051	0.037	0.014	0.068	0.033	0.011	0.007	0.447	0.008	0.043	0.108	0.040	0.005	0.050	0.431	1.442
211	0.589	1.246	1.406	1.026	0.302	0.034	0.126	0.173	0.164	0.082	0.107	0.187	0.144	0.099	0.048	0.429	0.084	0.156	0.231	0.152	0.062	0.029	0.162	0.759
212	0.589	1.246	1.405	1.026	0.302	0.034	0.126	0.173	0.164	0.082	0.107	0.187	0.144	0.099	0.048	0.429	0.084	0.156	0.231	0.152	0.062	0.029	0.162	0.759
213	0.589	1.246	1.406	1.026	0.302	0.034	0.126	0.173	0.164	0.082	0.107	0.187	0.144	0.099	0.048	0.429	0.084	0.156	0.231	0.152	0.062	0.029	0.162	0.759
214	0.589	1.246	1.406	1.027	0.302	0.034	0.126	0.173	0.164	0.082	0.107	0.187	0.144	0.099	0.047	0.429	0.084	0.156	0.231	0.152	0.062	0.029	0.162	0.760
215	0.587	1.243	1.402	1.024	0.300	0.034	0.127	0.174	0.165	0.082	0.107	0.187	0.144	0.099	0.048	0.429	0.084	0.157	0.231	0.153	0.062	0.029	0.161	0.757
216	0.590	1.247	1.407	1.028	0.303	0.033	0.126	0.173	0.164	0.082	0.106	0.186	0.143	0.099	0.047	0.429	0.083	0.156	0.230	0.152	0.061	0.029	0.162	0.760
217	0.593	1.253	1.413	1.033	0.306	0.033	0.125	0.172	0.163	0.080	0.105	0.185	0.142	0.098	0.046	0.429	0.082	0.155	0.229	0.150	0.060	0.029	0.164	0.764
218	0.590	1.247	1.407	1.028	0.303	0.034	0.126	0.173	0.164	0.082	0.107	0.187	0.144	0.099	0.048	0.428	0.084	0.156	0.231	0.152	0.062	0.029	0.162	0.760
219	0.625	1.300	1.462	1.077	0.338	0.034	0.120	0.166	0.157	0.075	0.100	0.179	0.137	0.093	0.044	0.430	0.078	0.149	0.223	0.145	0.057	0.029	0.178	0.801
220	0.596	1.253	1.413	1.034	0.309	0.035	0.128	0.174	0.165	0.083	0.108	0.188	0.145	0.101	0.050	0.426	0.085	0.158	0.232	0.153	0.064	0.030	0.167	0.767
221	0.130	0.475	0.580	0.336	0.163	0.048	0.289	0.342	0.332	0.251	0.266	0.356	0.310	0.257	0.192	0.307	0.237	0.324	0.399	0.319	0.207	0.096	0.013	0.207
222	0.130	0.475	0.580	0.336	0.163	0.048	0.289	0.342	0.332	0.251	0.266	0.356	0.311	0.257	0.192	0.307	0.237	0.324	0.399	0.319	0.207	0.096	0.013	0.207
223	0.130	0.475	0.581	0.336	0.163	0.048	0.289	0.342	0.332	0.251	0.266	0.356	0.310	0.257	0.192	0.307	0.237	0.324	0.399	0.319	0.207	0.096	0.013	0.207
224	0.130	0.475	0.580	0.336	0.163	0.048	0.290	0.342	0.332	0.251	0.266	0.356	0.311	0.257	0.193	0.307	0.237	0.324	0.400	0.319	0.207	0.096	0.013	0.207
225	0.130	0.475	0.580	0.336	0.163	0.048	0.289	0.342	0.332	0.251	0.266	0.356	0.310	0.257	0.192	0.307	0.237	0.324	0.399	0.319	0.207	0.096	0.013	0.207
226	0.130	0.474	0.580	0.336	0.163	0.049	0.290	0.342	0.333	0.252	0.267	0.356	0.311	0.257	0.193	0.306	0.237	0.324	0.400	0.319	0.208	0.097	0.013	0.207
227	0.130	0.474	0.580	0.336	0.163	0.049	0.290	0.342	0.332	0.252	0.267	0.356	0.311	0.257	0.193	0.307	0.237	0.324	0.400	0.319	0.207	0.097	0.013	0.207
228	0.134	0.482	0.588	0.342	0.160	0.047	0.287	0.340	0.330	0.249	0.264	0.354	0.308	0.255	0.190	0.309	0.235	0.322	0.397	0.317	0.205	0.095	0.014	0.211
229	0.129	0.470	0.575	0.333	0.165	0.051	0.292	0.344	0.334	0.253	0.269	0.358	0.313	0.259	0.195	0.304	0.239	0.326	0.401	0.321	0.210	0.099	0.015	0.205
230	0.136	0.484	0.590	0.344	0.158	0.048	0.288	0.340	0.330	0.249	0.264	0.354	0.309	0.255	0.191	0.308	0.235	0.322	0.397	0.317	0.206	0.095	0.016	0.213

231	0.021	0.069	0.111	0.028	0.276	0.308	0.557	0.599	0.591	0.503	0.537	0.608	0.572	0.529	0.470	0.028	0.511	0.582	0.642	0.578	0.482	0.365	0.156	0.014
232	0.021	0.069	0.111	0.028	0.276	0.308	0.557	0.599	0.592	0.503	0.538	0.609	0.573	0.530	0.471	0.028	0.511	0.583	0.642	0.578	0.482	0.365	0.156	0.014
233	0.021	0.069	0.111	0.028	0.276	0.308	0.557	0.599	0.591	0.503	0.537	0.608	0.572	0.529	0.470	0.028	0.511	0.582	0.642	0.578	0.482	0.364	0.156	0.014
234	0.021	0.069	0.111	0.028	0.276	0.308	0.557	0.599	0.591	0.503	0.537	0.608	0.573	0.529	0.470	0.028	0.511	0.582	0.642	0.578	0.482	0.365	0.156	0.014
235	0.022	0.067	0.109	0.027	0.275	0.311	0.559	0.601	0.594	0.506	0.540	0.611	0.575	0.532	0.473	0.025	0.514	0.585	0.645	0.580	0.485	0.368	0.159	0.014
236	0.021	0.070	0.113	0.029	0.276	0.307	0.555	0.597	0.590	0.502	0.536	0.607	0.571	0.528	0.469	0.030	0.510	0.581	0.641	0.576	0.481	0.363	0.155	0.014
237	0.022	0.068	0.109	0.028	0.275	0.311	0.559	0.601	0.594	0.506	0.540	0.611	0.575	0.532	0.473	0.025	0.514	0.585	0.644	0.580	0.485	0.368	0.159	0.014
238	0.022	0.079	0.123	0.035	0.275	0.298	0.547	0.590	0.582	0.495	0.528	0.600	0.563	0.520	0.460	0.039	0.502	0.574	0.634	0.569	0.472	0.355	0.148	0.017
239	0.025	0.077	0.121	0.035	0.272	0.305	0.553	0.595	0.588	0.500	0.534	0.605	0.569	0.526	0.467	0.032	0.508	0.579	0.639	0.574	0.479	0.362	0.155	0.019
240	0.036	0.093	0.136	0.048	0.260	0.306	0.552	0.594	0.587	0.499	0.533	0.604	0.568	0.525	0.466	0.052	0.507	0.578	0.638	0.573	0.478	0.362	0.160	0.031

Table 20: MO values of all DGs at each scenario (GA)

MO values (GA)																								
DGs	***S 1***	***S 2***	***S 3***	***S 4***	***S 5***	***S 6***	***S 7***	***S 8***	***S 9***	***S 10***	***S 11***	***S 12***	***S 13***	***S 14***	***S 15***	***S 16***	***S 17***	***S 18***	***S 19***	***S 20***	***S 21***	***S 22***	***S 23***	***S 24***
1	0.589	0.782	0.835	0.720	0.566	0.509	0.597	0.624	0.619	0.636	0.586	0.633	0.611	0.582	0.560	0.541	0.572	0.617	0.652	0.614	0.559	0.516	0.503	0.634
2	0.591	0.784	0.837	0.723	0.568	0.510	0.597	0.624	0.619	0.636	0.586	0.633	0.611	0.582	0.560	0.541	0.572	0.617	0.652	0.614	0.559	0.516	0.504	0.636
3	0.593	0.783	0.835	0.723	0.570	0.514	0.600	0.627	0.623	0.639	0.590	0.637	0.615	0.586	0.564	0.546	0.576	0.620	0.655	0.618	0.564	0.521	0.508	0.637
4	0.594	0.783	0.835	0.723	0.571	0.517	0.602	0.629	0.625	0.641	0.592	0.638	0.617	0.588	0.567	0.548	0.578	0.622	0.657	0.619	0.566	0.523	0.511	0.638
5	0.595	0.787	0.839	0.726	0.572	0.514	0.599	0.626	0.622	0.638	0.589	0.636	0.614	0.585	0.563	0.545	0.575	0.619	0.654	0.617	0.563	0.520	0.509	0.640
6	0.597	0.790	0.843	0.729	0.573	0.513	0.598	0.625	0.620	0.636	0.587	0.634	0.613	0.583	0.562	0.543	0.574	0.618	0.653	0.615	0.561	0.519	0.509	0.642
7	0.598	0.790	0.843	0.730	0.574	0.514	0.599	0.626	0.621	0.638	0.589	0.635	0.614	0.585	0.563	0.545	0.575	0.619	0.654	0.616	0.562	0.521	0.510	0.642
8	0.599	0.795	0.848	0.733	0.576	0.512	0.597	0.623	0.619	0.635	0.586	0.633	0.611	0.582	0.561	0.542	0.572	0.617	0.652	0.614	0.560	0.518	0.509	0.645
9	0.600	0.791	0.843	0.731	0.577	0.518	0.601	0.628	0.624	0.640	0.591	0.637	0.616	0.587	0.566	0.548	0.577	0.621	0.656	0.618	0.565	0.524	0.514	0.645
10	0.602	0.794	0.847	0.734	0.578	0.517	0.600	0.627	0.622	0.638	0.590	0.636	0.615	0.586	0.565	0.547	0.576	0.620	0.655	0.617	0.564	0.523	0.514	0.646
11	0.684	0.672	0.675	0.687	0.659	0.786	0.835	0.848	0.846	0.854	0.831	0.852	0.842	0.829	0.820	0.811	0.824	0.844	0.860	0.842	0.816	0.791	0.746	0.673
12	0.683	0.675	0.679	0.688	0.659	0.783	0.832	0.845	0.843	0.851	0.828	0.849	0.839	0.826	0.817	0.807	0.821	0.841	0.857	0.839	0.813	0.787	0.743	0.673
13	0.682	0.678	0.683	0.690	0.658	0.777	0.828	0.841	0.839	0.846	0.823	0.845	0.835	0.821	0.812	0.802	0.816	0.836	0.853	0.834	0.808	0.782	0.739	0.673
14	0.684	0.680	0.685	0.692	0.660	0.778	0.828	0.841	0.839	0.847	0.824	0.845	0.835	0.822	0.812	0.803	0.816	0.837	0.854	0.835	0.808	0.783	0.740	0.676

15	0.686	0.682	0.687	0.694	0.662	0.780	0.829	0.842	0.840	0.847	0.824	0.846	0.836	0.823	0.813	0.804	0.817	0.837	0.854	0.835	0.809	0.784	0.742	0.677
16	0.684	0.684	0.690	0.695	0.659	0.773	0.823	0.837	0.835	0.842	0.818	0.841	0.831	0.817	0.807	0.797	0.811	0.832	0.849	0.830	0.803	0.778	0.736	0.676
17	0.684	0.686	0.692	0.696	0.659	0.772	0.823	0.836	0.834	0.842	0.818	0.840	0.830	0.816	0.806	0.797	0.810	0.831	0.849	0.829	0.802	0.777	0.735	0.677
18	0.685	0.688	0.694	0.698	0.660	0.771	0.821	0.835	0.833	0.840	0.816	0.839	0.829	0.815	0.805	0.795	0.809	0.830	0.847	0.828	0.801	0.776	0.735	0.678
19	0.689	0.690	0.696	0.700	0.664	0.775	0.824	0.837	0.835	0.843	0.819	0.841	0.831	0.818	0.808	0.799	0.812	0.833	0.850	0.831	0.804	0.779	0.739	0.681
20	0.687	0.693	0.700	0.701	0.662	0.769	0.819	0.832	0.830	0.838	0.814	0.837	0.826	0.812	0.802	0.793	0.807	0.828	0.845	0.826	0.799	0.773	0.734	0.681
21	0.733	0.669	0.660	0.704	0.709	0.867	0.900	0.908	0.907	0.912	0.897	0.911	0.905	0.897	0.891	0.886	0.893	0.905	0.915	0.903	0.887	0.869	0.825	0.708
22	0.733	0.671	0.662	0.705	0.710	0.866	0.899	0.908	0.906	0.911	0.897	0.910	0.904	0.896	0.891	0.885	0.892	0.904	0.915	0.902	0.886	0.869	0.825	0.709
23	0.735	0.673	0.663	0.707	0.711	0.866	0.899	0.908	0.906	0.911	0.897	0.910	0.904	0.896	0.891	0.885	0.892	0.904	0.914	0.902	0.886	0.869	0.826	0.710
24	0.737	0.674	0.665	0.709	0.713	0.869	0.901	0.909	0.908	0.912	0.898	0.911	0.905	0.898	0.893	0.887	0.894	0.905	0.916	0.904	0.888	0.871	0.828	0.712
25	0.737	0.675	0.666	0.710	0.713	0.867	0.900	0.908	0.907	0.911	0.897	0.910	0.904	0.896	0.891	0.886	0.893	0.904	0.915	0.903	0.886	0.870	0.827	0.712
26	0.734	0.676	0.667	0.709	0.710	0.862	0.895	0.904	0.903	0.907	0.893	0.906	0.900	0.892	0.887	0.881	0.888	0.900	0.911	0.899	0.882	0.864	0.822	0.710
27	0.739	0.678	0.668	0.712	0.715	0.868	0.900	0.908	0.907	0.911	0.897	0.910	0.904	0.897	0.892	0.886	0.893	0.904	0.915	0.903	0.887	0.870	0.829	0.714
28	0.737	0.678	0.670	0.712	0.713	0.864	0.897	0.905	0.904	0.909	0.894	0.908	0.901	0.894	0.889	0.883	0.890	0.902	0.912	0.900	0.884	0.867	0.825	0.713
29	0.738	0.680	0.671	0.713	0.714	0.865	0.897	0.905	0.904	0.909	0.894	0.907	0.901	0.894	0.888	0.883	0.890	0.901	0.912	0.900	0.884	0.867	0.826	0.715
30	0.746	0.682	0.672	0.718	0.722	0.875	0.904	0.912	0.911	0.915	0.902	0.914	0.909	0.902	0.897	0.892	0.898	0.909	0.918	0.907	0.892	0.876	0.836	0.721
31	0.618	0.675	0.695	0.661	0.595	0.675	0.747	0.766	0.763	0.774	0.740	0.772	0.757	0.737	0.721	0.707	0.729	0.761	0.785	0.758	0.719	0.683	0.637	0.626
32	0.620	0.677	0.698	0.664	0.596	0.674	0.746	0.765	0.762	0.773	0.739	0.771	0.756	0.736	0.721	0.706	0.728	0.760	0.784	0.757	0.718	0.682	0.637	0.628
33	0.622	0.678	0.699	0.665	0.599	0.677	0.748	0.767	0.764	0.775	0.741	0.773	0.758	0.738	0.723	0.709	0.731	0.762	0.786	0.759	0.721	0.685	0.640	0.630
34	0.634	0.689	0.709	0.677	0.610	0.684	0.752	0.771	0.768	0.779	0.745	0.777	0.762	0.743	0.728	0.714	0.736	0.766	0.789	0.763	0.726	0.692	0.649	0.642
35	0.633	0.693	0.714	0.679	0.610	0.679	0.747	0.766	0.763	0.774	0.740	0.772	0.757	0.737	0.722	0.709	0.730	0.761	0.785	0.758	0.720	0.686	0.645	0.642
36	0.634	0.695	0.717	0.681	0.610	0.677	0.746	0.764	0.761	0.772	0.738	0.771	0.756	0.736	0.721	0.707	0.728	0.759	0.783	0.757	0.719	0.684	0.644	0.643
37	0.636	0.696	0.717	0.682	0.613	0.681	0.749	0.767	0.764	0.775	0.741	0.773	0.759	0.739	0.724	0.710	0.732	0.762	0.786	0.759	0.722	0.688	0.648	0.645
38	0.638	0.698	0.719	0.684	0.614	0.681	0.749	0.767	0.764	0.775	0.741	0.773	0.759	0.739	0.724	0.711	0.732	0.762	0.786	0.759	0.722	0.688	0.649	0.647
39	0.639	0.700	0.721	0.686	0.615	0.681	0.748	0.767	0.764	0.775	0.741	0.773	0.758	0.739	0.724	0.711	0.731	0.762	0.785	0.759	0.722	0.688	0.649	0.649
40	0.639	0.703	0.726	0.688	0.615	0.677	0.744	0.763	0.760	0.771	0.737	0.769	0.754	0.734	0.720	0.706	0.727	0.757	0.781	0.755	0.717	0.683	0.645	0.649
41	0.580	0.758	0.807	0.699	0.558	0.520	0.612	0.639	0.634	0.650	0.601	0.648	0.626	0.597	0.575	0.555	0.587	0.632	0.667	0.629	0.575	0.529	0.504	0.621
42	0.581	0.760	0.810	0.701	0.559	0.520	0.612	0.639	0.634	0.650	0.601	0.648	0.626	0.597	0.575	0.555	0.587	0.632	0.667	0.629	0.575	0.530	0.505	0.623

43	0.583	0.760	0.809	0.701	0.560	0.522	0.613	0.640	0.636	0.652	0.603	0.650	0.628	0.599	0.577	0.557	0.589	0.633	0.668	0.631	0.576	0.532	0.508	0.624
44	0.583	0.762	0.812	0.703	0.561	0.521	0.612	0.639	0.634	0.651	0.601	0.648	0.627	0.597	0.575	0.556	0.587	0.632	0.667	0.629	0.575	0.530	0.507	0.625
45	0.584	0.764	0.814	0.705	0.562	0.521	0.612	0.639	0.634	0.650	0.601	0.648	0.626	0.597	0.575	0.555	0.587	0.632	0.667	0.629	0.575	0.530	0.507	0.626
46	0.586	0.763	0.812	0.705	0.563	0.524	0.614	0.641	0.636	0.653	0.604	0.650	0.629	0.600	0.578	0.558	0.590	0.634	0.669	0.632	0.578	0.533	0.510	0.627
47	0.586	0.767	0.817	0.708	0.564	0.521	0.611	0.638	0.633	0.650	0.601	0.648	0.626	0.596	0.575	0.555	0.587	0.631	0.666	0.629	0.574	0.530	0.508	0.629
48	0.588	0.766	0.816	0.708	0.565	0.524	0.614	0.640	0.636	0.652	0.603	0.650	0.628	0.599	0.577	0.558	0.589	0.634	0.669	0.631	0.577	0.533	0.511	0.629
49	0.589	0.769	0.818	0.709	0.566	0.524	0.613	0.640	0.635	0.651	0.602	0.649	0.628	0.598	0.577	0.557	0.589	0.633	0.668	0.630	0.576	0.532	0.511	0.631
50	0.590	0.770	0.819	0.711	0.567	0.525	0.613	0.640	0.635	0.652	0.603	0.649	0.628	0.599	0.577	0.558	0.589	0.633	0.668	0.631	0.577	0.533	0.512	0.632
51	0.972	1.629	1.774	1.425	0.961	0.254	0.256	0.289	0.283	0.305	0.244	0.303	0.273	0.240	0.221	0.214	0.231	0.282	0.331	0.279	0.224	0.230	0.466	1.152
52	0.971	1.627	1.772	1.424	0.960	0.255	0.257	0.290	0.283	0.306	0.245	0.303	0.274	0.240	0.222	0.215	0.232	0.282	0.332	0.280	0.225	0.230	0.466	1.151
53	0.969	1.624	1.768	1.421	0.958	0.255	0.258	0.290	0.284	0.306	0.246	0.304	0.275	0.241	0.223	0.216	0.233	0.283	0.333	0.281	0.225	0.231	0.466	1.149
54	0.976	1.633	1.778	1.430	0.964	0.256	0.257	0.289	0.283	0.305	0.245	0.303	0.274	0.240	0.222	0.215	0.232	0.282	0.331	0.279	0.225	0.231	0.469	1.156
55	0.973	1.630	1.774	1.426	0.962	0.256	0.257	0.290	0.284	0.306	0.245	0.304	0.274	0.241	0.223	0.216	0.233	0.283	0.332	0.280	0.225	0.231	0.468	1.153
56	0.978	1.636	1.781	1.432	0.966	0.256	0.257	0.289	0.283	0.305	0.245	0.303	0.274	0.241	0.222	0.216	0.232	0.282	0.331	0.280	0.225	0.232	0.470	1.159
57	0.971	1.625	1.769	1.423	0.959	0.257	0.259	0.291	0.285	0.307	0.247	0.305	0.276	0.243	0.224	0.217	0.234	0.284	0.334	0.282	0.227	0.232	0.468	1.151
58	0.981	1.641	1.786	1.437	0.969	0.257	0.256	0.289	0.283	0.305	0.245	0.302	0.273	0.240	0.222	0.216	0.232	0.282	0.331	0.279	0.225	0.232	0.472	1.163
59	0.981	1.640	1.784	1.436	0.969	0.257	0.257	0.289	0.283	0.305	0.245	0.303	0.274	0.241	0.223	0.217	0.233	0.282	0.331	0.280	0.225	0.232	0.472	1.162
60	0.981	1.639	1.784	1.436	0.969	0.258	0.257	0.290	0.284	0.306	0.246	0.303	0.274	0.241	0.223	0.217	0.233	0.283	0.332	0.280	0.226	0.233	0.472	1.162
61	2.304	3.533	3.755	3.218	2.305	0.481	0.125	0.117	0.116	0.121	0.137	0.120	0.117	0.143	0.187	0.253	0.157	0.116	0.134	0.117	0.181	0.374	1.135	2.666
62	2.301	3.529	3.751	3.214	2.302	0.480	0.126	0.117	0.116	0.121	0.137	0.120	0.117	0.143	0.187	0.253	0.157	0.117	0.135	0.117	0.181	0.374	1.134	2.663
63	2.317	3.550	3.773	3.234	2.318	0.484	0.126	0.116	0.116	0.120	0.137	0.119	0.117	0.143	0.189	0.255	0.158	0.116	0.134	0.117	0.182	0.377	1.143	2.681
64	2.293	3.518	3.740	3.204	2.294	0.479	0.126	0.117	0.117	0.122	0.137	0.121	0.118	0.143	0.187	0.253	0.157	0.117	0.136	0.118	0.181	0.373	1.130	2.654
65	2.280	3.501	3.722	3.187	2.281	0.476	0.126	0.118	0.117	0.122	0.137	0.122	0.118	0.143	0.186	0.251	0.157	0.118	0.136	0.118	0.181	0.371	1.123	2.640
66	2.298	3.524	3.746	3.209	2.299	0.480	0.126	0.118	0.117	0.122	0.138	0.121	0.118	0.143	0.188	0.254	0.158	0.118	0.136	0.118	0.182	0.374	1.133	2.659
67	2.321	3.555	3.778	3.239	2.322	0.486	0.127	0.117	0.117	0.121	0.138	0.120	0.118	0.144	0.190	0.256	0.159	0.117	0.134	0.118	0.183	0.379	1.146	2.685
68	2.318	3.550	3.773	3.234	2.318	0.485	0.127	0.118	0.117	0.121	0.138	0.121	0.118	0.144	0.190	0.256	0.159	0.118	0.135	0.118	0.183	0.378	1.144	2.681
69	2.311	3.541	3.763	3.226	2.311	0.484	0.127	0.118	0.117	0.122	0.138	0.121	0.119	0.144	0.189	0.256	0.159	0.118	0.135	0.119	0.183	0.377	1.140	2.674
70	2.315	3.545	3.767	3.230	2.315	0.485	0.127	0.118	0.118	0.122	0.139	0.122	0.119	0.145	0.190	0.256	0.159	0.118	0.135	0.119	0.184	0.378	1.143	2.677

71	2.746	4.124	4.363	3.785	2.753	0.594	0.129	0.101	0.105	0.098	0.147	0.098	0.111	0.156	0.219	0.307	0.177	0.106	0.105	0.108	0.211	0.461	1.389	3.157
72	2.761	4.143	4.383	3.804	2.768	0.599	0.130	0.102	0.105	0.098	0.148	0.098	0.112	0.157	0.221	0.309	0.179	0.106	0.104	0.108	0.212	0.465	1.398	3.174
73	2.780	4.168	4.408	3.828	2.787	0.604	0.131	0.102	0.105	0.098	0.150	0.098	0.112	0.159	0.223	0.312	0.180	0.106	0.104	0.109	0.214	0.469	1.409	3.195
74	2.771	4.156	4.396	3.816	2.778	0.602	0.131	0.102	0.105	0.098	0.149	0.099	0.112	0.158	0.222	0.311	0.180	0.106	0.104	0.109	0.214	0.467	1.404	3.185
75	2.736	4.109	4.348	3.771	2.742	0.592	0.130	0.102	0.105	0.099	0.148	0.099	0.112	0.157	0.219	0.306	0.178	0.106	0.106	0.109	0.211	0.460	1.383	3.146
76	2.777	4.162	4.403	3.823	2.783	0.604	0.131	0.102	0.105	0.098	0.150	0.099	0.112	0.159	0.223	0.312	0.180	0.107	0.105	0.109	0.214	0.469	1.407	3.191
77	2.763	4.144	4.384	3.805	2.769	0.600	0.131	0.102	0.106	0.099	0.149	0.099	0.112	0.158	0.222	0.310	0.180	0.107	0.105	0.109	0.213	0.466	1.399	3.176
78	2.768	4.150	4.390	3.811	2.774	0.602	0.131	0.103	0.106	0.099	0.150	0.099	0.113	0.159	0.222	0.311	0.180	0.107	0.106	0.109	0.214	0.468	1.402	3.181
79	2.778	4.164	4.404	3.824	2.785	0.605	0.132	0.103	0.106	0.099	0.150	0.099	0.113	0.159	0.224	0.313	0.181	0.107	0.105	0.110	0.215	0.470	1.409	3.192
80	2.773	4.157	4.397	3.818	2.780	0.604	0.132	0.103	0.106	0.099	0.150	0.099	0.113	0.159	0.223	0.312	0.181	0.107	0.106	0.110	0.215	0.469	1.406	3.187
81	2.689	4.054	4.294	3.718	2.695	0.575	0.124	0.098	0.101	0.095	0.141	0.095	0.107	0.150	0.210	0.295	0.170	0.102	0.103	0.104	0.202	0.445	1.354	3.096
82	2.700	4.068	4.307	3.731	2.705	0.578	0.124	0.098	0.101	0.094	0.142	0.095	0.107	0.150	0.211	0.297	0.171	0.102	0.102	0.104	0.203	0.447	1.361	3.107
83	2.702	4.070	4.310	3.733	2.707	0.579	0.125	0.098	0.101	0.094	0.142	0.095	0.107	0.151	0.212	0.297	0.171	0.102	0.102	0.104	0.203	0.448	1.362	3.109
84	2.701	4.068	4.308	3.732	2.706	0.579	0.125	0.098	0.101	0.095	0.142	0.095	0.107	0.151	0.212	0.297	0.171	0.102	0.103	0.104	0.203	0.448	1.361	3.108
85	2.688	4.051	4.290	3.715	2.693	0.575	0.124	0.098	0.101	0.095	0.142	0.095	0.107	0.150	0.211	0.295	0.170	0.102	0.103	0.104	0.202	0.445	1.354	3.094
86	2.710	4.081	4.321	3.744	2.715	0.582	0.125	0.098	0.101	0.094	0.143	0.095	0.108	0.151	0.213	0.299	0.172	0.102	0.102	0.104	0.204	0.450	1.367	3.118
87	2.711	4.082	4.322	3.745	2.716	0.582	0.125	0.099	0.101	0.095	0.143	0.095	0.108	0.151	0.213	0.299	0.172	0.102	0.102	0.105	0.204	0.450	1.368	3.119
88	2.716	4.088	4.328	3.751	2.721	0.584	0.126	0.099	0.102	0.095	0.143	0.095	0.108	0.152	0.214	0.300	0.172	0.103	0.102	0.105	0.205	0.452	1.371	3.125
89	2.716	4.088	4.328	3.751	2.721	0.584	0.126	0.099	0.102	0.095	0.143	0.095	0.108	0.152	0.214	0.300	0.173	0.103	0.102	0.105	0.205	0.452	1.371	3.124
90	2.697	4.063	4.303	3.727	2.702	0.579	0.125	0.099	0.102	0.095	0.143	0.096	0.108	0.151	0.212	0.298	0.172	0.103	0.103	0.105	0.204	0.448	1.360	3.104
91	3.059	4.530	4.779	4.180	3.066	0.687	0.142	0.105	0.110	0.096	0.165	0.097	0.119	0.176	0.252	0.356	0.202	0.111	0.095	0.114	0.242	0.534	1.577	3.501
92	3.034	4.497	4.746	4.148	3.041	0.680	0.142	0.105	0.109	0.096	0.164	0.097	0.118	0.175	0.250	0.352	0.200	0.111	0.096	0.114	0.240	0.528	1.562	3.474
93	3.060	4.531	4.780	4.181	3.067	0.688	0.143	0.105	0.110	0.096	0.166	0.097	0.119	0.177	0.253	0.356	0.203	0.111	0.095	0.114	0.242	0.534	1.578	3.503
94	3.070	4.544	4.793	4.193	3.077	0.691	0.143	0.106	0.110	0.096	0.167	0.097	0.120	0.178	0.254	0.358	0.204	0.112	0.095	0.115	0.244	0.537	1.584	3.513
95	3.058	4.528	4.777	4.178	3.065	0.687	0.143	0.106	0.110	0.096	0.166	0.098	0.119	0.177	0.253	0.356	0.203	0.112	0.095	0.115	0.243	0.534	1.577	3.500
96	3.071	4.545	4.794	4.194	3.078	0.692	0.144	0.106	0.111	0.097	0.167	0.098	0.120	0.178	0.255	0.359	0.204	0.112	0.095	0.115	0.244	0.538	1.585	3.515
97	3.084	4.561	4.811	4.210	3.091	0.695	0.145	0.106	0.111	0.097	0.168	0.098	0.120	0.179	0.256	0.361	0.205	0.112	0.095	0.116	0.246	0.541	1.593	3.529
98	3.048	4.514	4.763	4.165	3.055	0.685	0.143	0.106	0.111	0.097	0.166	0.098	0.120	0.177	0.253	0.355	0.203	0.112	0.096	0.115	0.242	0.533	1.571	3.489

99	3.076	4.551	4.800	4.201	3.083	0.694	0.145	0.107	0.111	0.097	0.168	0.098	0.121	0.179	0.256	0.360	0.205	0.113	0.096	0.116	0.245	0.539	1.588	3.520
100	3.069	4.541	4.790	4.191	3.076	0.692	0.145	0.107	0.111	0.097	0.168	0.098	0.121	0.179	0.255	0.359	0.205	0.113	0.096	0.116	0.245	0.538	1.584	3.512
101	2.058	3.206	3.419	2.902	2.059	0.416	0.123	0.126	0.124	0.134	0.129	0.133	0.122	0.133	0.167	0.221	0.144	0.124	0.152	0.124	0.163	0.325	0.994	2.394
102	2.058	3.204	3.418	2.901	2.058	0.416	0.123	0.127	0.124	0.135	0.129	0.133	0.122	0.133	0.168	0.222	0.144	0.125	0.152	0.124	0.163	0.325	0.994	2.393
103	2.065	3.214	3.428	2.911	2.066	0.418	0.123	0.126	0.124	0.134	0.129	0.133	0.122	0.134	0.168	0.222	0.145	0.124	0.152	0.124	0.164	0.326	0.998	2.401
104	2.076	3.229	3.443	2.925	2.077	0.421	0.123	0.126	0.124	0.134	0.130	0.133	0.122	0.134	0.169	0.224	0.145	0.124	0.151	0.124	0.164	0.328	1.004	2.413
105	2.066	3.216	3.429	2.912	2.067	0.419	0.123	0.127	0.124	0.134	0.130	0.133	0.122	0.134	0.169	0.223	0.145	0.125	0.152	0.124	0.164	0.327	0.999	2.403
106	2.071	3.222	3.436	2.918	2.072	0.420	0.123	0.127	0.124	0.134	0.130	0.133	0.122	0.134	0.169	0.224	0.145	0.125	0.152	0.125	0.165	0.328	1.002	2.408
107	2.065	3.214	3.427	2.911	2.066	0.419	0.124	0.127	0.125	0.135	0.130	0.134	0.123	0.134	0.169	0.223	0.145	0.125	0.152	0.125	0.164	0.327	0.999	2.401
108	2.077	3.230	3.444	2.926	2.078	0.422	0.124	0.127	0.125	0.134	0.130	0.133	0.122	0.135	0.170	0.224	0.146	0.125	0.152	0.125	0.165	0.329	1.005	2.415
109	2.071	3.221	3.435	2.918	2.072	0.421	0.124	0.127	0.125	0.135	0.130	0.134	0.123	0.135	0.170	0.224	0.146	0.125	0.153	0.125	0.165	0.328	1.002	2.408
110	2.079	3.232	3.446	2.929	2.080	0.423	0.124	0.127	0.125	0.134	0.131	0.133	0.123	0.135	0.170	0.225	0.146	0.125	0.152	0.125	0.166	0.330	1.007	2.417
111	3.034	4.497	4.745	4.147	3.042	0.678	0.141	0.104	0.109	0.096	0.164	0.097	0.118	0.174	0.249	0.351	0.200	0.110	0.096	0.113	0.239	0.528	1.561	3.474
112	3.040	4.505	4.753	4.155	3.049	0.680	0.142	0.105	0.109	0.096	0.164	0.097	0.118	0.175	0.250	0.352	0.200	0.111	0.096	0.114	0.240	0.529	1.565	3.481
113	3.018	4.476	4.723	4.126	3.026	0.674	0.141	0.104	0.109	0.096	0.163	0.097	0.118	0.174	0.248	0.349	0.199	0.110	0.096	0.113	0.238	0.524	1.551	3.456
114	3.045	4.511	4.759	4.161	3.054	0.682	0.142	0.105	0.110	0.096	0.165	0.098	0.119	0.176	0.251	0.354	0.202	0.111	0.096	0.114	0.241	0.531	1.568	3.486
115	3.029	4.490	4.738	4.141	3.038	0.678	0.142	0.105	0.110	0.097	0.164	0.098	0.119	0.175	0.250	0.352	0.201	0.111	0.097	0.114	0.240	0.528	1.559	3.469
116	3.021	4.479	4.726	4.130	3.029	0.676	0.142	0.105	0.110	0.097	0.164	0.098	0.119	0.175	0.249	0.351	0.200	0.111	0.097	0.114	0.239	0.526	1.554	3.460
117	3.044	4.509	4.757	4.159	3.053	0.683	0.143	0.106	0.110	0.097	0.165	0.098	0.119	0.176	0.252	0.354	0.202	0.112	0.097	0.115	0.242	0.531	1.568	3.485
118	3.020	4.477	4.725	4.128	3.028	0.676	0.142	0.105	0.110	0.097	0.164	0.098	0.119	0.175	0.249	0.350	0.200	0.111	0.097	0.114	0.239	0.526	1.553	3.458
119	3.032	4.493	4.741	4.144	3.040	0.679	0.142	0.106	0.110	0.097	0.165	0.098	0.119	0.176	0.251	0.353	0.201	0.112	0.097	0.115	0.241	0.529	1.561	3.472
120	3.037	4.499	4.747	4.150	3.045	0.681	0.143	0.106	0.111	0.098	0.166	0.099	0.120	0.176	0.251	0.354	0.202	0.112	0.097	0.115	0.241	0.530	1.564	3.477
121	2.498	3.792	4.022	3.466	2.501	0.531	0.128	0.110	0.111	0.110	0.143	0.110	0.115	0.150	0.202	0.277	0.167	0.112	0.121	0.113	0.195	0.413	1.247	2.882
122	2.526	3.828	4.059	3.501	2.529	0.539	0.130	0.110	0.111	0.110	0.144	0.110	0.115	0.151	0.205	0.281	0.169	0.112	0.120	0.114	0.197	0.419	1.264	2.912
123	2.501	3.794	4.024	3.469	2.504	0.533	0.130	0.111	0.112	0.112	0.144	0.112	0.116	0.151	0.203	0.279	0.169	0.113	0.122	0.115	0.196	0.415	1.250	2.884
124	2.487	3.776	4.005	3.452	2.490	0.529	0.130	0.112	0.113	0.113	0.144	0.112	0.117	0.151	0.203	0.277	0.168	0.114	0.123	0.115	0.196	0.412	1.242	2.869
125	2.486	3.774	4.003	3.450	2.489	0.529	0.130	0.112	0.113	0.113	0.144	0.113	0.117	0.151	0.203	0.277	0.168	0.114	0.124	0.116	0.196	0.412	1.242	2.868
126	2.499	3.790	4.020	3.466	2.502	0.533	0.131	0.113	0.114	0.113	0.145	0.113	0.117	0.152	0.204	0.279	0.170	0.115	0.123	0.116	0.197	0.415	1.249	2.882

127	2.507	3.801	4.031	3.476	2.510	0.536	0.132	0.113	0.114	0.113	0.146	0.113	0.118	0.153	0.205	0.281	0.170	0.115	0.123	0.116	0.198	0.417	1.254	2.891
128	2.499	3.789	4.019	3.465	2.501	0.534	0.132	0.114	0.115	0.114	0.146	0.114	0.118	0.153	0.205	0.280	0.170	0.115	0.124	0.117	0.198	0.416	1.250	2.882
129	2.495	3.784	4.013	3.460	2.497	0.533	0.132	0.114	0.115	0.114	0.146	0.114	0.118	0.153	0.205	0.280	0.171	0.116	0.125	0.117	0.198	0.415	1.248	2.877
130	2.499	3.789	4.018	3.465	2.502	0.534	0.132	0.114	0.115	0.114	0.147	0.114	0.119	0.154	0.206	0.281	0.171	0.116	0.125	0.117	0.199	0.417	1.250	2.882
131	2.019	3.144	3.353	2.845	2.018	0.413	0.131	0.137	0.134	0.145	0.136	0.144	0.131	0.140	0.173	0.224	0.150	0.134	0.163	0.134	0.169	0.324	0.977	2.348
132	2.017	3.140	3.349	2.842	2.016	0.413	0.131	0.137	0.134	0.145	0.137	0.144	0.131	0.140	0.173	0.224	0.151	0.135	0.163	0.134	0.169	0.324	0.976	2.345
133	2.032	3.160	3.370	2.861	2.031	0.417	0.131	0.137	0.134	0.145	0.137	0.143	0.131	0.141	0.174	0.226	0.151	0.134	0.162	0.134	0.170	0.327	0.984	2.362
134	2.025	3.150	3.360	2.851	2.024	0.415	0.132	0.138	0.135	0.146	0.138	0.145	0.132	0.141	0.174	0.226	0.151	0.135	0.163	0.135	0.170	0.326	0.980	2.354
135	2.042	3.173	3.383	2.873	2.041	0.419	0.132	0.137	0.134	0.145	0.138	0.143	0.131	0.141	0.175	0.227	0.152	0.134	0.162	0.134	0.171	0.329	0.990	2.373
136	2.030	3.157	3.366	2.858	2.029	0.417	0.133	0.138	0.135	0.146	0.138	0.145	0.132	0.142	0.175	0.227	0.152	0.135	0.164	0.135	0.171	0.328	0.984	2.360
137	2.028	3.153	3.362	2.854	2.027	0.417	0.133	0.138	0.136	0.146	0.138	0.145	0.133	0.142	0.175	0.227	0.152	0.136	0.164	0.136	0.171	0.327	0.983	2.357
138	2.026	3.151	3.360	2.852	2.025	0.417	0.133	0.138	0.136	0.147	0.138	0.145	0.133	0.142	0.175	0.227	0.153	0.136	0.164	0.136	0.171	0.327	0.982	2.355
139	2.036	3.164	3.374	2.865	2.035	0.419	0.133	0.138	0.136	0.146	0.139	0.145	0.133	0.142	0.176	0.228	0.153	0.136	0.164	0.136	0.172	0.329	0.987	2.366
140	2.033	3.160	3.370	2.861	2.032	0.419	0.134	0.139	0.136	0.147	0.139	0.145	0.133	0.142	0.176	0.228	0.153	0.136	0.164	0.136	0.172	0.329	0.986	2.363
141	1.662	2.654	2.847	2.378	1.659	0.335	0.148	0.166	0.162	0.178	0.145	0.176	0.156	0.145	0.159	0.194	0.147	0.162	0.200	0.161	0.157	0.267	0.784	1.948
142	1.652	2.639	2.831	2.364	1.648	0.333	0.149	0.167	0.163	0.179	0.146	0.177	0.157	0.146	0.159	0.194	0.148	0.163	0.201	0.162	0.158	0.266	0.779	1.936
143	1.647	2.631	2.823	2.357	1.643	0.332	0.150	0.168	0.164	0.180	0.147	0.179	0.159	0.147	0.160	0.194	0.149	0.164	0.202	0.163	0.158	0.266	0.777	1.930
144	1.657	2.645	2.837	2.370	1.653	0.335	0.150	0.168	0.163	0.179	0.147	0.178	0.158	0.146	0.160	0.195	0.149	0.163	0.201	0.162	0.158	0.268	0.782	1.942
145	1.640	2.621	2.812	2.347	1.636	0.331	0.151	0.170	0.165	0.181	0.148	0.180	0.160	0.148	0.160	0.194	0.150	0.165	0.204	0.164	0.159	0.266	0.774	1.922
146	1.646	2.630	2.822	2.356	1.642	0.333	0.151	0.169	0.165	0.181	0.148	0.179	0.159	0.148	0.160	0.194	0.150	0.165	0.203	0.164	0.159	0.267	0.777	1.930
147	1.649	2.634	2.825	2.359	1.645	0.334	0.151	0.169	0.165	0.181	0.148	0.179	0.159	0.148	0.161	0.195	0.150	0.165	0.203	0.164	0.159	0.267	0.779	1.933
148	1.669	2.661	2.854	2.386	1.665	0.337	0.150	0.167	0.163	0.179	0.147	0.177	0.158	0.147	0.161	0.196	0.150	0.163	0.201	0.162	0.159	0.270	0.789	1.955
149	1.654	2.641	2.833	2.366	1.650	0.335	0.151	0.169	0.165	0.181	0.148	0.179	0.159	0.148	0.161	0.195	0.150	0.165	0.203	0.164	0.160	0.268	0.782	1.939
150	1.644	2.625	2.816	2.351	1.639	0.333	0.152	0.171	0.166	0.182	0.149	0.181	0.161	0.149	0.162	0.195	0.151	0.166	0.205	0.165	0.160	0.267	0.776	1.926
151	1.370	2.241	2.418	1.989	1.364	0.283	0.176	0.201	0.196	0.215	0.168	0.213	0.188	0.166	0.163	0.182	0.163	0.195	0.239	0.193	0.163	0.233	0.637	1.617
152	1.362	2.229	2.405	1.977	1.356	0.282	0.177	0.202	0.197	0.216	0.169	0.214	0.189	0.167	0.163	0.182	0.164	0.196	0.241	0.195	0.164	0.233	0.633	1.608
153	1.358	2.223	2.399	1.972	1.352	0.282	0.178	0.203	0.198	0.217	0.170	0.215	0.190	0.167	0.164	0.183	0.164	0.197	0.242	0.195	0.164	0.233	0.631	1.603
154	1.361	2.226	2.402	1.975	1.354	0.282	0.178	0.203	0.198	0.217	0.170	0.215	0.190	0.167	0.164	0.183	0.164	0.197	0.242	0.196	0.165	0.233	0.633	1.606

155	1.364	2.231	2.407	1.979	1.358	0.283	0.178	0.203	0.198	0.217	0.170	0.215	0.190	0.168	0.164	0.183	0.164	0.197	0.241	0.196	0.165	0.234	0.635	1.610
156	1.370	2.239	2.415	1.987	1.364	0.284	0.177	0.202	0.197	0.216	0.170	0.214	0.190	0.167	0.164	0.183	0.164	0.197	0.241	0.195	0.165	0.235	0.638	1.616
157	1.369	2.237	2.413	1.986	1.363	0.284	0.178	0.203	0.198	0.217	0.170	0.215	0.190	0.168	0.165	0.184	0.165	0.197	0.241	0.196	0.165	0.235	0.638	1.615
158	1.356	2.218	2.393	1.968	1.350	0.283	0.180	0.205	0.200	0.219	0.172	0.217	0.192	0.169	0.166	0.184	0.166	0.199	0.244	0.198	0.167	0.234	0.631	1.600
159	1.355	2.215	2.390	1.965	1.348	0.283	0.180	0.206	0.200	0.220	0.172	0.218	0.193	0.170	0.166	0.184	0.167	0.200	0.244	0.198	0.167	0.234	0.631	1.598
160	1.369	2.235	2.411	1.984	1.362	0.285	0.179	0.204	0.199	0.218	0.171	0.216	0.191	0.169	0.166	0.185	0.166	0.198	0.242	0.197	0.166	0.236	0.638	1.614
161	1.851	2.921	3.125	2.632	1.849	0.371	0.132	0.142	0.139	0.152	0.133	0.151	0.135	0.136	0.161	0.205	0.143	0.139	0.172	0.138	0.158	0.292	0.882	2.162
162	1.840	2.905	3.108	2.616	1.838	0.369	0.132	0.143	0.140	0.154	0.134	0.152	0.136	0.136	0.161	0.204	0.143	0.140	0.174	0.139	0.158	0.291	0.876	2.149
163	1.845	2.911	3.114	2.622	1.842	0.370	0.133	0.143	0.140	0.153	0.134	0.152	0.136	0.136	0.161	0.205	0.144	0.140	0.174	0.139	0.158	0.292	0.879	2.154
164	1.842	2.907	3.110	2.618	1.839	0.370	0.133	0.144	0.140	0.154	0.135	0.152	0.136	0.137	0.161	0.205	0.144	0.140	0.174	0.140	0.158	0.292	0.878	2.151
165	1.834	2.896	3.099	2.608	1.831	0.369	0.134	0.145	0.141	0.155	0.135	0.153	0.137	0.137	0.162	0.205	0.144	0.141	0.175	0.140	0.158	0.291	0.874	2.142
166	1.852	2.920	3.124	2.631	1.849	0.372	0.133	0.143	0.140	0.154	0.135	0.152	0.136	0.137	0.162	0.206	0.144	0.140	0.174	0.139	0.159	0.294	0.883	2.162
167	1.842	2.907	3.109	2.618	1.840	0.371	0.134	0.144	0.141	0.155	0.135	0.153	0.137	0.137	0.162	0.206	0.144	0.141	0.175	0.140	0.159	0.292	0.878	2.151
168	1.838	2.901	3.103	2.613	1.835	0.370	0.134	0.145	0.142	0.155	0.136	0.154	0.137	0.138	0.162	0.206	0.145	0.142	0.176	0.141	0.159	0.292	0.876	2.147
169	1.853	2.921	3.124	2.632	1.850	0.373	0.134	0.144	0.141	0.154	0.136	0.153	0.137	0.138	0.163	0.207	0.145	0.141	0.174	0.140	0.160	0.294	0.884	2.163
170	1.862	2.933	3.136	2.643	1.859	0.375	0.134	0.143	0.140	0.154	0.136	0.152	0.136	0.138	0.163	0.208	0.145	0.140	0.174	0.139	0.160	0.296	0.889	2.173
171	2.665	4.017	4.255	3.683	2.670	0.571	0.126	0.101	0.104	0.100	0.143	0.100	0.110	0.151	0.211	0.294	0.171	0.105	0.108	0.107	0.203	0.443	1.341	3.067
172	2.657	4.007	4.244	3.673	2.662	0.569	0.126	0.101	0.104	0.100	0.143	0.100	0.110	0.151	0.210	0.294	0.171	0.105	0.108	0.107	0.202	0.441	1.337	3.059
173	2.645	3.991	4.227	3.657	2.650	0.566	0.126	0.102	0.104	0.101	0.143	0.101	0.110	0.151	0.209	0.292	0.170	0.105	0.109	0.107	0.201	0.439	1.329	3.045
174	2.651	3.998	4.235	3.664	2.656	0.568	0.126	0.102	0.104	0.101	0.143	0.101	0.110	0.151	0.210	0.293	0.171	0.105	0.109	0.107	0.202	0.440	1.333	3.052
175	2.644	3.989	4.225	3.655	2.649	0.566	0.126	0.102	0.104	0.101	0.143	0.101	0.110	0.151	0.210	0.292	0.171	0.105	0.109	0.107	0.202	0.439	1.329	3.044
176	2.639	3.982	4.218	3.649	2.644	0.565	0.126	0.102	0.104	0.101	0.143	0.101	0.110	0.151	0.210	0.292	0.171	0.105	0.110	0.107	0.202	0.438	1.326	3.038
177	2.653	4.000	4.237	3.666	2.658	0.569	0.127	0.102	0.105	0.101	0.144	0.101	0.110	0.152	0.211	0.294	0.172	0.106	0.110	0.108	0.203	0.441	1.335	3.054
178	2.651	3.998	4.234	3.664	2.656	0.569	0.127	0.103	0.105	0.102	0.144	0.102	0.111	0.152	0.211	0.294	0.172	0.106	0.110	0.108	0.203	0.441	1.334	3.052
179	2.666	4.017	4.253	3.682	2.671	0.573	0.128	0.103	0.105	0.102	0.145	0.102	0.111	0.153	0.212	0.296	0.173	0.106	0.110	0.108	0.204	0.445	1.342	3.068
180	2.669	4.021	4.258	3.687	2.674	0.574	0.128	0.103	0.105	0.102	0.145	0.102	0.111	0.153	0.213	0.297	0.173	0.106	0.110	0.108	0.205	0.446	1.345	3.072
181	3.567	5.191	5.456	4.821	3.581	0.838	0.163	0.110	0.117	0.096	0.194	0.098	0.130	0.208	0.306	0.436	0.242	0.119	0.082	0.123	0.292	0.654	1.882	4.061
182	3.555	5.175	5.439	4.806	3.569	0.835	0.163	0.110	0.117	0.096	0.193	0.098	0.130	0.208	0.305	0.434	0.241	0.119	0.082	0.123	0.291	0.651	1.875	4.048

183	3.568	5.191	5.456	4.821	3.581	0.839	0.163	0.110	0.117	0.096	0.194	0.098	0.131	0.209	0.306	0.436	0.242	0.119	0.082	0.124	0.293	0.654	1.883	4.061
184	3.585	5.213	5.478	4.843	3.599	0.845	0.165	0.111	0.118	0.096	0.196	0.098	0.132	0.210	0.309	0.440	0.244	0.120	0.082	0.125	0.295	0.659	1.894	4.081
185	3.565	5.188	5.452	4.818	3.579	0.838	0.164	0.111	0.118	0.096	0.194	0.098	0.131	0.209	0.306	0.436	0.242	0.120	0.082	0.124	0.293	0.654	1.881	4.059
186	3.577	5.202	5.466	4.832	3.590	0.842	0.165	0.111	0.118	0.097	0.196	0.099	0.132	0.210	0.308	0.438	0.244	0.120	0.082	0.125	0.294	0.657	1.889	4.071
187	3.564	5.186	5.450	4.816	3.577	0.838	0.164	0.111	0.118	0.096	0.194	0.098	0.131	0.209	0.307	0.436	0.242	0.120	0.083	0.124	0.293	0.654	1.881	4.057
188	3.598	5.228	5.493	4.858	3.611	0.849	0.166	0.112	0.119	0.097	0.197	0.099	0.133	0.212	0.311	0.442	0.246	0.121	0.083	0.126	0.297	0.663	1.902	4.094
189	3.559	5.179	5.443	4.809	3.572	0.837	0.164	0.111	0.118	0.096	0.194	0.099	0.131	0.209	0.306	0.435	0.242	0.120	0.083	0.124	0.292	0.653	1.878	4.051
190	3.564	5.184	5.449	4.815	3.577	0.839	0.164	0.111	0.119	0.097	0.195	0.099	0.132	0.210	0.307	0.437	0.243	0.120	0.083	0.125	0.293	0.654	1.881	4.056
191	2.598	3.929	4.163	3.598	2.601	0.555	0.126	0.104	0.105	0.104	0.142	0.103	0.111	0.150	0.207	0.288	0.169	0.106	0.113	0.108	0.199	0.431	1.304	2.993
192	2.599	3.930	4.165	3.599	2.602	0.556	0.127	0.104	0.106	0.104	0.143	0.104	0.111	0.151	0.208	0.288	0.170	0.107	0.113	0.108	0.200	0.432	1.305	2.995
193	2.621	3.958	4.194	3.627	2.624	0.562	0.128	0.104	0.106	0.103	0.144	0.103	0.111	0.152	0.210	0.291	0.171	0.107	0.112	0.109	0.202	0.436	1.318	3.019
194	2.613	3.947	4.182	3.616	2.616	0.560	0.128	0.104	0.106	0.104	0.144	0.104	0.112	0.152	0.209	0.291	0.171	0.107	0.113	0.109	0.201	0.435	1.313	3.010
195	2.648	3.993	4.229	3.660	2.651	0.570	0.129	0.104	0.106	0.103	0.145	0.103	0.112	0.154	0.213	0.296	0.173	0.107	0.111	0.109	0.204	0.443	1.334	3.048
196	2.643	3.987	4.223	3.654	2.646	0.569	0.129	0.104	0.106	0.104	0.145	0.104	0.112	0.154	0.212	0.295	0.173	0.107	0.112	0.109	0.204	0.442	1.331	3.043
197	2.624	3.960	4.196	3.629	2.627	0.564	0.128	0.105	0.107	0.104	0.145	0.104	0.112	0.153	0.211	0.293	0.172	0.108	0.113	0.109	0.203	0.438	1.320	3.021
198	2.619	3.955	4.190	3.624	2.622	0.563	0.129	0.105	0.107	0.105	0.145	0.105	0.113	0.153	0.211	0.292	0.172	0.108	0.113	0.110	0.203	0.437	1.318	3.017
199	2.613	3.946	4.180	3.615	2.616	0.561	0.129	0.106	0.107	0.105	0.145	0.105	0.113	0.153	0.210	0.291	0.172	0.108	0.114	0.110	0.202	0.436	1.314	3.009
200	2.607	3.938	4.172	3.607	2.610	0.560	0.129	0.106	0.107	0.106	0.145	0.105	0.113	0.153	0.210	0.291	0.172	0.108	0.114	0.110	0.202	0.435	1.310	3.002
201	1.687	2.688	2.883	2.411	1.684	0.340	0.146	0.163	0.159	0.174	0.143	0.173	0.153	0.143	0.160	0.196	0.147	0.159	0.196	0.158	0.158	0.271	0.798	1.976
202	1.694	2.697	2.892	2.420	1.691	0.341	0.146	0.162	0.158	0.174	0.143	0.172	0.153	0.143	0.160	0.197	0.147	0.158	0.195	0.157	0.158	0.272	0.801	1.983
203	1.706	2.714	2.909	2.435	1.703	0.344	0.145	0.162	0.158	0.173	0.143	0.171	0.152	0.143	0.161	0.198	0.147	0.158	0.195	0.157	0.158	0.274	0.808	1.997
204	1.684	2.682	2.876	2.406	1.680	0.340	0.148	0.164	0.160	0.176	0.145	0.174	0.155	0.145	0.161	0.197	0.149	0.160	0.198	0.159	0.159	0.272	0.797	1.972
205	1.703	2.709	2.904	2.431	1.700	0.344	0.146	0.163	0.158	0.174	0.144	0.172	0.153	0.144	0.161	0.198	0.148	0.158	0.195	0.157	0.159	0.275	0.807	1.993
206	1.704	2.710	2.905	2.432	1.701	0.345	0.146	0.163	0.159	0.174	0.144	0.172	0.154	0.145	0.162	0.198	0.149	0.159	0.196	0.158	0.159	0.275	0.808	1.994
207	1.704	2.709	2.904	2.431	1.700	0.345	0.147	0.163	0.159	0.174	0.144	0.173	0.154	0.145	0.162	0.199	0.149	0.159	0.196	0.158	0.160	0.275	0.808	1.994
208	1.712	2.721	2.915	2.442	1.709	0.347	0.147	0.163	0.159	0.174	0.144	0.172	0.154	0.145	0.162	0.199	0.149	0.159	0.195	0.158	0.160	0.277	0.812	2.003
209	1.703	2.708	2.902	2.430	1.700	0.346	0.148	0.164	0.160	0.175	0.146	0.174	0.155	0.146	0.162	0.199	0.150	0.160	0.197	0.159	0.160	0.276	0.808	1.993
210	1.708	2.714	2.909	2.436	1.704	0.347	0.147	0.164	0.160	0.175	0.145	0.173	0.154	0.146	0.163	0.200	0.150	0.160	0.196	0.159	0.161	0.277	0.811	1.999

211	1.146	1.888	2.044	1.665	1.136	0.275	0.229	0.258	0.252	0.273	0.220	0.270	0.244	0.217	0.205	0.209	0.211	0.252	0.298	0.249	0.207	0.240	0.546	1.353
212	1.145	1.885	2.042	1.663	1.135	0.275	0.230	0.259	0.253	0.274	0.221	0.271	0.245	0.218	0.206	0.210	0.212	0.252	0.299	0.250	0.208	0.240	0.546	1.352
213	1.141	1.878	2.033	1.657	1.130	0.276	0.232	0.260	0.255	0.275	0.222	0.273	0.247	0.219	0.208	0.212	0.213	0.254	0.300	0.252	0.209	0.241	0.545	1.346
214	1.140	1.875	2.031	1.655	1.129	0.276	0.233	0.261	0.256	0.276	0.224	0.274	0.248	0.220	0.209	0.212	0.214	0.255	0.301	0.253	0.210	0.242	0.545	1.345
215	1.134	1.867	2.022	1.647	1.124	0.276	0.234	0.263	0.257	0.278	0.225	0.276	0.249	0.222	0.210	0.213	0.216	0.257	0.303	0.255	0.211	0.242	0.543	1.339
216	1.151	1.893	2.049	1.671	1.141	0.278	0.231	0.259	0.254	0.274	0.222	0.272	0.246	0.219	0.208	0.212	0.213	0.253	0.299	0.251	0.209	0.243	0.550	1.358
217	1.153	1.894	2.050	1.672	1.143	0.278	0.232	0.260	0.254	0.274	0.222	0.272	0.246	0.219	0.208	0.213	0.214	0.254	0.299	0.252	0.210	0.243	0.552	1.360
218	1.139	1.873	2.028	1.653	1.129	0.278	0.235	0.263	0.258	0.278	0.225	0.276	0.249	0.222	0.211	0.214	0.216	0.257	0.303	0.255	0.212	0.243	0.546	1.344
219	1.161	1.906	2.063	1.684	1.151	0.280	0.231	0.259	0.253	0.273	0.222	0.271	0.245	0.219	0.208	0.213	0.213	0.253	0.298	0.251	0.210	0.244	0.556	1.370
220	1.155	1.895	2.051	1.674	1.144	0.280	0.233	0.261	0.255	0.275	0.224	0.273	0.247	0.220	0.210	0.214	0.215	0.255	0.300	0.252	0.211	0.244	0.553	1.362
221	0.670	1.083	1.182	0.946	0.653	0.321	0.404	0.439	0.432	0.454	0.390	0.452	0.423	0.385	0.359	0.338	0.374	0.431	0.478	0.428	0.361	0.322	0.398	0.778
222	0.674	1.090	1.190	0.952	0.657	0.320	0.402	0.437	0.431	0.452	0.388	0.450	0.421	0.383	0.357	0.337	0.372	0.429	0.477	0.426	0.359	0.321	0.399	0.783
223	0.675	1.092	1.192	0.954	0.658	0.320	0.402	0.437	0.431	0.452	0.388	0.450	0.421	0.383	0.357	0.337	0.372	0.429	0.477	0.426	0.359	0.321	0.399	0.784
224	0.675	1.091	1.191	0.953	0.658	0.321	0.403	0.437	0.431	0.453	0.389	0.450	0.421	0.384	0.357	0.337	0.373	0.430	0.477	0.427	0.360	0.321	0.400	0.784
225	0.674	1.088	1.187	0.951	0.657	0.323	0.405	0.439	0.433	0.455	0.391	0.452	0.423	0.386	0.360	0.340	0.375	0.431	0.479	0.429	0.362	0.323	0.400	0.782
226	0.676	1.091	1.190	0.953	0.658	0.323	0.404	0.439	0.433	0.454	0.391	0.452	0.423	0.385	0.359	0.339	0.374	0.431	0.478	0.428	0.362	0.323	0.401	0.785
227	0.675	1.089	1.188	0.952	0.658	0.324	0.405	0.440	0.434	0.456	0.392	0.453	0.424	0.387	0.361	0.341	0.376	0.432	0.480	0.429	0.363	0.325	0.402	0.784
228	0.678	1.094	1.194	0.956	0.661	0.323	0.404	0.439	0.432	0.454	0.391	0.452	0.423	0.385	0.359	0.339	0.374	0.431	0.478	0.428	0.362	0.324	0.402	0.787
229	0.678	1.093	1.192	0.956	0.660	0.324	0.405	0.439	0.433	0.455	0.391	0.453	0.424	0.386	0.360	0.340	0.375	0.432	0.479	0.429	0.363	0.325	0.403	0.787
230	0.680	1.095	1.195	0.958	0.662	0.324	0.405	0.439	0.433	0.455	0.391	0.452	0.423	0.386	0.360	0.340	0.375	0.431	0.479	0.429	0.362	0.325	0.404	0.789
231	0.583	0.702	0.739	0.665	0.561	0.585	0.671	0.695	0.691	0.705	0.662	0.703	0.684	0.658	0.639	0.621	0.649	0.689	0.719	0.686	0.637	0.595	0.556	0.608
232	0.584	0.705	0.742	0.667	0.561	0.583	0.669	0.693	0.689	0.703	0.659	0.701	0.682	0.656	0.636	0.618	0.647	0.687	0.717	0.684	0.635	0.592	0.554	0.609
233	0.585	0.705	0.741	0.668	0.562	0.586	0.671	0.695	0.691	0.705	0.662	0.703	0.684	0.659	0.639	0.621	0.650	0.689	0.719	0.686	0.638	0.595	0.557	0.610
234	0.585	0.709	0.746	0.670	0.562	0.582	0.667	0.691	0.687	0.702	0.658	0.700	0.681	0.654	0.635	0.617	0.645	0.685	0.716	0.682	0.634	0.591	0.554	0.611
235	0.586	0.712	0.750	0.673	0.563	0.578	0.664	0.688	0.684	0.699	0.655	0.697	0.677	0.651	0.631	0.613	0.642	0.682	0.713	0.679	0.630	0.588	0.552	0.612
236	0.587	0.711	0.748	0.673	0.565	0.583	0.668	0.692	0.688	0.702	0.659	0.700	0.681	0.655	0.636	0.618	0.646	0.686	0.716	0.683	0.634	0.592	0.556	0.613
237	0.588	0.713	0.751	0.674	0.565	0.581	0.666	0.690	0.686	0.700	0.657	0.698	0.679	0.653	0.633	0.615	0.644	0.684	0.715	0.681	0.632	0.590	0.554	0.614
238	0.589	0.714	0.752	0.675	0.566	0.581	0.666	0.690	0.686	0.701	0.657	0.699	0.680	0.654	0.634	0.616	0.645	0.684	0.715	0.682	0.633	0.591	0.555	0.615

239	0.590	0.717	0.755	0.678	0.567	0.580	0.665	0.689	0.685	0.699	0.656	0.697	0.678	0.652	0.633	0.615	0.643	0.683	0.714	0.680	0.631	0.589	0.555	0.617
240	0.591	0.717	0.754	0.678	0.568	0.583	0.667	0.691	0.687	0.701	0.658	0.699	0.680	0.654	0.635	0.617	0.646	0.685	0.715	0.682	0.634	0.592	0.558	0.618

Table 21: Fitness values of all DGs at each scenario (GA)

Fitness values (GA)																								
DGs	***S 1***	***S 2***	***S 3***	***S 4***	***S 5***	***S 6***	***S 7***	***S 8***	***S 9***	***S 10***	***S 11***	***S 12***	***S 13***	***S 14***	***S 15***	***S 16***	***S 17***	***S 18***	***S 19***	***S 20***	***S 21***	***S 22***	***S 23***	***S 24***
1	0.076	0.217	0.277	0.156	0.079	0.276	0.485	0.531	0.527	0.553	0.469	0.550	0.511	0.457	0.413	0.373	0.439	0.524	0.579	0.519	0.418	0.304	0.146	0.102
2	0.078	0.220	0.279	0.159	0.081	0.277	0.485	0.531	0.527	0.553	0.469	0.550	0.511	0.457	0.413	0.373	0.439	0.524	0.579	0.519	0.418	0.305	0.147	0.104
3	0.079	0.218	0.277	0.158	0.083	0.282	0.489	0.535	0.531	0.557	0.473	0.553	0.514	0.461	0.417	0.377	0.443	0.527	0.582	0.522	0.422	0.309	0.151	0.105
4	0.081	0.218	0.277	0.159	0.084	0.284	0.491	0.537	0.532	0.558	0.475	0.555	0.516	0.463	0.419	0.380	0.445	0.529	0.584	0.524	0.424	0.312	0.154	0.106
5	0.082	0.222	0.281	0.162	0.085	0.281	0.488	0.534	0.530	0.556	0.472	0.552	0.513	0.460	0.416	0.377	0.442	0.526	0.581	0.521	0.421	0.309	0.152	0.108
6	0.083	0.226	0.285	0.165	0.086	0.280	0.486	0.532	0.528	0.554	0.470	0.551	0.512	0.459	0.414	0.375	0.440	0.525	0.580	0.520	0.420	0.307	0.152	0.110
7	0.084	0.226	0.285	0.165	0.087	0.282	0.487	0.534	0.529	0.555	0.472	0.552	0.513	0.460	0.416	0.377	0.442	0.526	0.581	0.521	0.421	0.309	0.153	0.111
8	0.086	0.230	0.290	0.169	0.089	0.280	0.485	0.531	0.527	0.553	0.469	0.550	0.511	0.458	0.413	0.374	0.439	0.523	0.578	0.518	0.418	0.307	0.152	0.113
9	0.087	0.227	0.285	0.167	0.090	0.285	0.490	0.536	0.531	0.557	0.474	0.554	0.515	0.463	0.419	0.380	0.444	0.528	0.582	0.523	0.424	0.312	0.157	0.113
10	0.088	0.230	0.289	0.170	0.091	0.284	0.488	0.534	0.530	0.556	0.473	0.553	0.514	0.461	0.417	0.378	0.443	0.527	0.581	0.522	0.422	0.311	0.157	0.115
11	0.169	0.108	0.117	0.123	0.172	0.553	0.724	0.756	0.754	0.771	0.714	0.769	0.742	0.705	0.672	0.642	0.691	0.750	0.787	0.746	0.675	0.579	0.389	0.141
12	0.169	0.110	0.121	0.124	0.172	0.550	0.721	0.753	0.751	0.768	0.711	0.766	0.739	0.702	0.669	0.639	0.687	0.747	0.784	0.743	0.671	0.576	0.386	0.142
13	0.168	0.114	0.125	0.126	0.171	0.545	0.716	0.749	0.747	0.764	0.706	0.762	0.734	0.697	0.664	0.634	0.683	0.743	0.780	0.739	0.666	0.571	0.382	0.142
14	0.170	0.116	0.127	0.128	0.173	0.546	0.717	0.749	0.747	0.765	0.707	0.762	0.735	0.697	0.665	0.635	0.683	0.744	0.780	0.740	0.667	0.571	0.383	0.144
15	0.172	0.117	0.129	0.130	0.175	0.547	0.717	0.749	0.748	0.765	0.707	0.763	0.735	0.698	0.666	0.636	0.684	0.744	0.781	0.740	0.668	0.572	0.385	0.146
16	0.169	0.120	0.132	0.130	0.172	0.540	0.712	0.744	0.742	0.760	0.701	0.757	0.730	0.692	0.660	0.629	0.678	0.739	0.776	0.735	0.662	0.566	0.379	0.145
17	0.170	0.121	0.134	0.132	0.173	0.540	0.711	0.743	0.742	0.759	0.701	0.757	0.729	0.691	0.659	0.628	0.677	0.738	0.775	0.734	0.661	0.565	0.378	0.145
18	0.171	0.123	0.136	0.133	0.174	0.539	0.710	0.742	0.740	0.758	0.699	0.756	0.728	0.690	0.658	0.627	0.676	0.737	0.774	0.733	0.660	0.564	0.378	0.146
19	0.175	0.125	0.138	0.136	0.177	0.542	0.712	0.745	0.743	0.761	0.702	0.758	0.730	0.693	0.661	0.630	0.679	0.739	0.776	0.735	0.663	0.568	0.382	0.150

20	0.173	0.128	0.142	0.137	0.175	0.536	0.707	0.740	0.738	0.756	0.697	0.753	0.726	0.688	0.655	0.625	0.673	0.735	0.772	0.730	0.657	0.562	0.377	0.149
21	0.218	0.105	0.102	0.140	0.222	0.634	0.788	0.816	0.815	0.830	0.780	0.827	0.804	0.772	0.744	0.718	0.760	0.811	0.842	0.808	0.745	0.658	0.468	0.176
22	0.219	0.107	0.104	0.141	0.223	0.633	0.788	0.815	0.814	0.829	0.780	0.827	0.803	0.772	0.743	0.717	0.759	0.811	0.841	0.807	0.745	0.657	0.468	0.177
23	0.220	0.108	0.105	0.143	0.224	0.634	0.788	0.815	0.814	0.829	0.780	0.826	0.803	0.772	0.744	0.717	0.759	0.811	0.841	0.807	0.745	0.657	0.469	0.178
24	0.223	0.110	0.107	0.145	0.226	0.636	0.789	0.817	0.816	0.830	0.781	0.828	0.805	0.773	0.745	0.719	0.761	0.812	0.842	0.808	0.746	0.659	0.471	0.180
25	0.222	0.111	0.108	0.145	0.226	0.635	0.788	0.815	0.814	0.829	0.780	0.827	0.803	0.772	0.744	0.718	0.759	0.811	0.841	0.807	0.745	0.658	0.470	0.180
26	0.219	0.111	0.109	0.144	0.223	0.629	0.784	0.811	0.810	0.825	0.776	0.823	0.799	0.767	0.739	0.713	0.755	0.807	0.838	0.803	0.740	0.653	0.465	0.178
27	0.224	0.113	0.110	0.148	0.228	0.635	0.788	0.815	0.815	0.829	0.780	0.827	0.804	0.772	0.744	0.718	0.760	0.811	0.841	0.807	0.745	0.658	0.472	0.183
28	0.223	0.114	0.112	0.147	0.226	0.632	0.785	0.813	0.812	0.827	0.777	0.824	0.801	0.769	0.741	0.715	0.757	0.808	0.839	0.805	0.742	0.655	0.468	0.182
29	0.224	0.116	0.113	0.149	0.227	0.632	0.785	0.813	0.812	0.826	0.777	0.824	0.801	0.769	0.741	0.715	0.756	0.808	0.839	0.804	0.742	0.655	0.469	0.183
30	0.232	0.118	0.114	0.154	0.235	0.642	0.793	0.820	0.819	0.833	0.785	0.831	0.808	0.777	0.750	0.724	0.765	0.815	0.845	0.812	0.751	0.665	0.479	0.189
31	0.104	0.110	0.137	0.097	0.108	0.442	0.635	0.674	0.671	0.692	0.623	0.689	0.657	0.612	0.574	0.539	0.596	0.667	0.712	0.663	0.578	0.471	0.280	0.094
32	0.105	0.113	0.140	0.099	0.109	0.442	0.634	0.673	0.670	0.691	0.622	0.688	0.656	0.611	0.573	0.538	0.595	0.666	0.711	0.662	0.577	0.471	0.280	0.096
33	0.108	0.114	0.141	0.101	0.112	0.445	0.636	0.675	0.672	0.693	0.624	0.690	0.658	0.614	0.576	0.540	0.597	0.668	0.712	0.664	0.579	0.473	0.283	0.098
34	0.120	0.125	0.151	0.112	0.123	0.452	0.641	0.678	0.676	0.696	0.628	0.694	0.662	0.618	0.581	0.546	0.602	0.672	0.716	0.668	0.584	0.480	0.292	0.110
35	0.119	0.129	0.156	0.115	0.123	0.446	0.635	0.673	0.671	0.692	0.623	0.689	0.657	0.613	0.575	0.540	0.597	0.667	0.711	0.663	0.579	0.474	0.288	0.111
36	0.119	0.131	0.159	0.117	0.123	0.444	0.634	0.672	0.669	0.690	0.621	0.687	0.655	0.611	0.573	0.539	0.595	0.666	0.710	0.661	0.577	0.472	0.287	0.112
37	0.122	0.131	0.159	0.118	0.126	0.448	0.637	0.675	0.672	0.693	0.624	0.690	0.658	0.614	0.577	0.542	0.598	0.668	0.712	0.664	0.580	0.476	0.291	0.113
38	0.123	0.133	0.161	0.120	0.127	0.449	0.637	0.675	0.672	0.693	0.624	0.690	0.658	0.614	0.577	0.542	0.598	0.668	0.712	0.664	0.581	0.477	0.292	0.115
39	0.125	0.136	0.163	0.122	0.129	0.449	0.637	0.674	0.672	0.693	0.624	0.690	0.658	0.614	0.577	0.542	0.598	0.668	0.712	0.664	0.580	0.477	0.292	0.117
40	0.125	0.139	0.168	0.124	0.128	0.444	0.632	0.670	0.667	0.689	0.620	0.686	0.654	0.610	0.572	0.538	0.594	0.664	0.708	0.660	0.576	0.472	0.288	0.118
41	0.067	0.194	0.249	0.135	0.071	0.287	0.500	0.546	0.542	0.568	0.484	0.565	0.526	0.472	0.427	0.387	0.454	0.539	0.594	0.534	0.433	0.318	0.147	0.089
42	0.069	0.196	0.252	0.137	0.072	0.288	0.500	0.546	0.542	0.568	0.484	0.565	0.526	0.472	0.427	0.387	0.454	0.539	0.594	0.534	0.433	0.318	0.148	0.091
43	0.070	0.196	0.251	0.137	0.073	0.290	0.502	0.548	0.543	0.570	0.486	0.566	0.527	0.474	0.429	0.389	0.456	0.540	0.595	0.535	0.435	0.320	0.151	0.092
44	0.070	0.198	0.254	0.139	0.074	0.289	0.500	0.546	0.542	0.568	0.484	0.565	0.526	0.473	0.428	0.388	0.454	0.539	0.594	0.534	0.434	0.319	0.150	0.093
45	0.071	0.200	0.256	0.140	0.075	0.289	0.500	0.546	0.542	0.568	0.484	0.565	0.526	0.472	0.428	0.387	0.454	0.539	0.593	0.534	0.433	0.319	0.150	0.094
46	0.072	0.199	0.254	0.140	0.076	0.292	0.503	0.549	0.544	0.570	0.487	0.567	0.528	0.475	0.430	0.390	0.457	0.541	0.596	0.536	0.436	0.322	0.153	0.095
47	0.073	0.203	0.259	0.143	0.077	0.289	0.499	0.546	0.541	0.567	0.484	0.564	0.525	0.472	0.427	0.387	0.454	0.538	0.593	0.533	0.433	0.318	0.151	0.097

48	0.074	0.202	0.258	0.143	0.078	0.292	0.502	0.548	0.544	0.570	0.486	0.567	0.528	0.475	0.430	0.390	0.456	0.541	0.595	0.536	0.436	0.322	0.154	0.097
49	0.075	0.204	0.260	0.145	0.079	0.291	0.501	0.547	0.543	0.569	0.485	0.566	0.527	0.474	0.429	0.389	0.455	0.540	0.594	0.535	0.435	0.321	0.154	0.099
50	0.076	0.205	0.261	0.147	0.080	0.292	0.502	0.548	0.543	0.569	0.486	0.566	0.527	0.474	0.430	0.390	0.456	0.540	0.595	0.535	0.436	0.321	0.155	0.100
51	0.458	1.065	1.216	0.861	0.474	0.022	0.144	0.196	0.190	0.223	0.127	0.219	0.173	0.115	0.074	0.046	0.098	0.188	0.258	0.184	0.082	0.018	0.109	0.620
52	0.457	1.063	1.214	0.860	0.473	0.022	0.145	0.197	0.191	0.223	0.128	0.220	0.173	0.116	0.075	0.047	0.099	0.189	0.258	0.184	0.083	0.019	0.109	0.619
53	0.455	1.060	1.210	0.857	0.471	0.023	0.146	0.198	0.192	0.224	0.129	0.221	0.174	0.117	0.075	0.048	0.100	0.190	0.259	0.185	0.084	0.020	0.109	0.617
54	0.461	1.069	1.220	0.866	0.477	0.023	0.145	0.197	0.191	0.223	0.128	0.219	0.173	0.116	0.075	0.047	0.099	0.189	0.258	0.184	0.083	0.020	0.112	0.624
55	0.459	1.065	1.216	0.862	0.475	0.023	0.145	0.198	0.191	0.224	0.128	0.220	0.174	0.117	0.075	0.048	0.100	0.189	0.259	0.185	0.084	0.020	0.111	0.622
56	0.464	1.072	1.223	0.868	0.479	0.024	0.145	0.197	0.191	0.223	0.128	0.219	0.173	0.116	0.075	0.048	0.099	0.189	0.258	0.184	0.083	0.020	0.113	0.627
57	0.457	1.061	1.211	0.858	0.472	0.024	0.147	0.199	0.193	0.225	0.130	0.222	0.175	0.118	0.077	0.049	0.101	0.191	0.260	0.186	0.085	0.021	0.111	0.619
58	0.467	1.077	1.228	0.873	0.483	0.024	0.144	0.196	0.190	0.222	0.128	0.219	0.173	0.116	0.075	0.048	0.099	0.188	0.257	0.184	0.083	0.021	0.115	0.631
59	0.466	1.075	1.226	0.872	0.482	0.025	0.145	0.197	0.191	0.223	0.128	0.220	0.173	0.116	0.075	0.048	0.100	0.189	0.258	0.184	0.084	0.021	0.115	0.630
60	0.467	1.075	1.226	0.872	0.482	0.025	0.146	0.197	0.191	0.224	0.129	0.220	0.174	0.117	0.076	0.049	0.100	0.189	0.258	0.185	0.084	0.021	0.115	0.630
61	1.789	2.968	3.197	2.653	1.818	0.248	0.014	0.024	0.024	0.038	0.020	0.037	0.016	0.018	0.040	0.085	0.024	0.023	0.061	0.022	0.040	0.163	0.778	2.134
62	1.787	2.964	3.193	2.650	1.815	0.248	0.015	0.024	0.024	0.039	0.020	0.037	0.017	0.018	0.040	0.085	0.024	0.023	0.061	0.022	0.040	0.163	0.777	2.131
63	1.803	2.986	3.215	2.670	1.831	0.252	0.015	0.024	0.024	0.038	0.020	0.036	0.017	0.019	0.041	0.087	0.025	0.023	0.060	0.022	0.041	0.166	0.786	2.149
64	1.779	2.954	3.182	2.640	1.807	0.246	0.015	0.025	0.025	0.039	0.020	0.037	0.017	0.019	0.040	0.085	0.024	0.024	0.062	0.023	0.040	0.162	0.773	2.123
65	1.766	2.936	3.164	2.623	1.794	0.243	0.015	0.026	0.025	0.040	0.020	0.038	0.018	0.018	0.039	0.083	0.024	0.025	0.063	0.023	0.039	0.159	0.766	2.108
66	1.784	2.960	3.188	2.645	1.812	0.248	0.015	0.025	0.025	0.040	0.021	0.038	0.018	0.019	0.041	0.085	0.025	0.024	0.062	0.023	0.040	0.163	0.776	2.128
67	1.807	2.990	3.220	2.675	1.835	0.254	0.016	0.025	0.024	0.039	0.021	0.037	0.017	0.020	0.042	0.088	0.026	0.024	0.061	0.023	0.042	0.167	0.789	2.153
68	1.803	2.985	3.215	2.670	1.831	0.253	0.016	0.025	0.025	0.039	0.021	0.037	0.018	0.020	0.042	0.088	0.026	0.024	0.061	0.023	0.042	0.167	0.787	2.149
69	1.797	2.976	3.205	2.662	1.824	0.251	0.016	0.026	0.025	0.040	0.021	0.038	0.018	0.020	0.042	0.087	0.026	0.025	0.062	0.023	0.042	0.166	0.783	2.142
70	1.800	2.981	3.209	2.666	1.828	0.253	0.016	0.026	0.025	0.040	0.022	0.038	0.018	0.020	0.043	0.088	0.026	0.025	0.062	0.024	0.042	0.167	0.786	2.146
71	2.232	3.559	3.805	3.221	2.266	0.362	0.018	0.010	0.012	0.015	0.030	0.014	0.011	0.032	0.072	0.138	0.044	0.012	0.031	0.013	0.069	0.250	1.032	2.626
72	2.247	3.579	3.825	3.240	2.281	0.366	0.018	0.010	0.013	0.016	0.031	0.015	0.012	0.033	0.073	0.141	0.045	0.013	0.031	0.013	0.071	0.253	1.041	2.642
73	2.266	3.603	3.850	3.264	2.300	0.372	0.019	0.011	0.013	0.016	0.033	0.015	0.012	0.034	0.075	0.144	0.047	0.013	0.031	0.014	0.073	0.258	1.052	2.663
74	2.257	3.591	3.838	3.252	2.291	0.369	0.019	0.011	0.013	0.016	0.032	0.015	0.012	0.034	0.075	0.143	0.046	0.013	0.031	0.014	0.072	0.256	1.047	2.653
75	2.222	3.545	3.790	3.207	2.255	0.360	0.018	0.011	0.013	0.017	0.031	0.016	0.012	0.032	0.072	0.138	0.044	0.013	0.033	0.013	0.069	0.248	1.026	2.614

76	2.262	3.598	3.845	3.259	2.297	0.371	0.019	0.011	0.013	0.016	0.033	0.015	0.012	0.034	0.075	0.144	0.047	0.013	0.031	0.014	0.073	0.257	1.050	2.659
77	2.249	3.580	3.826	3.241	2.283	0.368	0.019	0.011	0.013	0.017	0.032	0.016	0.012	0.034	0.074	0.142	0.046	0.014	0.032	0.014	0.072	0.255	1.042	2.644
78	2.253	3.586	3.832	3.247	2.287	0.369	0.019	0.011	0.014	0.017	0.033	0.016	0.013	0.034	0.075	0.143	0.047	0.014	0.032	0.014	0.073	0.256	1.045	2.649
79	2.264	3.599	3.846	3.260	2.298	0.372	0.020	0.011	0.014	0.017	0.033	0.016	0.013	0.035	0.076	0.145	0.048	0.014	0.032	0.014	0.074	0.258	1.052	2.660
80	2.259	3.593	3.839	3.254	2.293	0.371	0.020	0.012	0.014	0.017	0.033	0.016	0.013	0.035	0.076	0.144	0.048	0.014	0.032	0.015	0.073	0.258	1.049	2.655
81	2.175	3.490	3.736	3.154	2.208	0.343	0.012	0.007	0.009	0.012	0.024	0.011	0.008	0.025	0.063	0.127	0.037	0.008	0.029	0.008	0.060	0.233	0.997	2.564
82	2.186	3.503	3.749	3.167	2.218	0.346	0.013	0.007	0.009	0.012	0.025	0.011	0.008	0.026	0.064	0.129	0.037	0.009	0.029	0.009	0.061	0.236	1.004	2.575
83	2.188	3.506	3.752	3.169	2.220	0.346	0.013	0.007	0.009	0.012	0.025	0.011	0.008	0.026	0.064	0.129	0.038	0.009	0.029	0.009	0.061	0.236	1.005	2.577
84	2.186	3.504	3.750	3.167	2.219	0.346	0.013	0.007	0.009	0.013	0.025	0.011	0.008	0.026	0.064	0.129	0.038	0.009	0.029	0.009	0.062	0.236	1.004	2.576
85	2.173	3.487	3.732	3.151	2.206	0.343	0.013	0.007	0.009	0.013	0.025	0.012	0.008	0.026	0.063	0.127	0.037	0.009	0.030	0.009	0.061	0.234	0.997	2.562
86	2.196	3.517	3.763	3.180	2.228	0.349	0.013	0.007	0.009	0.012	0.026	0.011	0.008	0.027	0.065	0.130	0.038	0.009	0.029	0.009	0.062	0.238	1.010	2.587
87	2.197	3.517	3.764	3.180	2.229	0.349	0.013	0.008	0.009	0.013	0.026	0.012	0.008	0.027	0.066	0.131	0.039	0.009	0.029	0.009	0.063	0.239	1.011	2.587
88	2.202	3.524	3.770	3.187	2.234	0.351	0.014	0.008	0.009	0.013	0.026	0.012	0.008	0.027	0.066	0.132	0.039	0.009	0.029	0.009	0.063	0.240	1.014	2.593
89	2.201	3.523	3.770	3.186	2.234	0.351	0.014	0.008	0.010	0.013	0.026	0.012	0.008	0.028	0.066	0.132	0.039	0.009	0.029	0.010	0.063	0.240	1.014	2.593
90	2.183	3.499	3.745	3.163	2.215	0.346	0.014	0.008	0.010	0.013	0.026	0.012	0.008	0.027	0.065	0.129	0.038	0.010	0.030	0.010	0.062	0.237	1.003	2.572
91	2.545	3.966	4.221	3.615	2.579	0.454	0.031	0.013	0.017	0.013	0.048	0.013	0.018	0.052	0.105	0.188	0.069	0.018	0.021	0.019	0.100	0.322	1.220	2.970
92	2.520	3.933	4.188	3.584	2.554	0.447	0.030	0.013	0.017	0.014	0.047	0.014	0.018	0.051	0.103	0.184	0.067	0.017	0.022	0.018	0.098	0.317	1.205	2.942
93	2.546	3.967	4.222	3.617	2.580	0.455	0.031	0.013	0.018	0.014	0.049	0.014	0.019	0.052	0.106	0.188	0.069	0.018	0.022	0.019	0.101	0.323	1.221	2.971
94	2.556	3.979	4.235	3.629	2.590	0.458	0.032	0.013	0.018	0.014	0.050	0.014	0.019	0.053	0.107	0.190	0.070	0.018	0.022	0.019	0.102	0.325	1.227	2.982
95	2.544	3.964	4.219	3.614	2.578	0.455	0.031	0.013	0.018	0.014	0.049	0.014	0.019	0.053	0.106	0.188	0.070	0.018	0.022	0.019	0.101	0.323	1.220	2.969
96	2.557	3.980	4.236	3.630	2.591	0.459	0.032	0.014	0.019	0.014	0.050	0.014	0.019	0.054	0.107	0.191	0.071	0.019	0.022	0.020	0.103	0.326	1.228	2.983
97	2.570	3.997	4.253	3.646	2.604	0.463	0.033	0.014	0.019	0.014	0.051	0.015	0.020	0.055	0.109	0.193	0.072	0.019	0.022	0.020	0.104	0.329	1.236	2.997
98	2.534	3.950	4.205	3.601	2.568	0.452	0.032	0.014	0.019	0.015	0.049	0.015	0.019	0.053	0.105	0.187	0.069	0.019	0.023	0.020	0.101	0.321	1.214	2.957
99	2.562	3.987	4.242	3.636	2.596	0.461	0.033	0.014	0.019	0.015	0.051	0.015	0.020	0.054	0.109	0.192	0.072	0.019	0.022	0.020	0.104	0.328	1.231	2.989
100	2.555	3.977	4.232	3.627	2.589	0.459	0.033	0.014	0.019	0.015	0.051	0.015	0.020	0.054	0.108	0.191	0.071	0.019	0.023	0.020	0.103	0.326	1.227	2.980
101	1.544	2.641	2.861	2.338	1.572	0.183	0.011	0.034	0.032	0.052	0.012	0.050	0.021	0.011	0.020	0.053	0.012	0.031	0.078	0.029	0.022	0.113	0.637	1.862
102	1.543	2.640	2.860	2.337	1.572	0.184	0.012	0.034	0.032	0.052	0.012	0.050	0.021	0.011	0.020	0.053	0.012	0.031	0.079	0.029	0.022	0.113	0.637	1.861
103	1.551	2.650	2.870	2.347	1.579	0.185	0.012	0.034	0.032	0.052	0.012	0.050	0.021	0.011	0.021	0.054	0.012	0.031	0.078	0.029	0.022	0.114	0.641	1.870

104	1.562	2.665	2.885	2.361	1.590	0.188	0.012	0.034	0.032	0.051	0.013	0.049	0.021	0.011	0.021	0.055	0.012	0.031	0.078	0.029	0.023	0.117	0.647	1.882
105	1.552	2.651	2.871	2.348	1.580	0.186	0.012	0.034	0.032	0.052	0.013	0.050	0.021	0.011	0.021	0.055	0.013	0.031	0.078	0.029	0.023	0.115	0.642	1.871
106	1.557	2.658	2.878	2.354	1.585	0.187	0.012	0.034	0.032	0.052	0.013	0.050	0.022	0.011	0.022	0.055	0.013	0.031	0.078	0.029	0.023	0.116	0.645	1.876
107	1.551	2.650	2.869	2.346	1.579	0.186	0.013	0.035	0.033	0.053	0.013	0.050	0.022	0.011	0.021	0.055	0.013	0.032	0.079	0.030	0.023	0.115	0.642	1.870
108	1.563	2.666	2.886	2.362	1.591	0.189	0.013	0.034	0.032	0.052	0.013	0.050	0.022	0.012	0.022	0.056	0.013	0.032	0.078	0.030	0.024	0.118	0.648	1.883
109	1.557	2.657	2.877	2.354	1.585	0.188	0.013	0.035	0.033	0.053	0.013	0.051	0.022	0.012	0.022	0.056	0.013	0.032	0.079	0.030	0.024	0.117	0.645	1.876
110	1.565	2.668	2.888	2.364	1.593	0.190	0.013	0.035	0.033	0.052	0.014	0.050	0.022	0.012	0.023	0.057	0.013	0.032	0.078	0.030	0.024	0.118	0.650	1.885
111	2.519	3.932	4.187	3.583	2.555	0.446	0.029	0.012	0.017	0.014	0.047	0.014	0.017	0.050	0.102	0.183	0.067	0.017	0.022	0.018	0.098	0.316	1.204	2.942
112	2.526	3.941	4.195	3.591	2.562	0.448	0.030	0.012	0.017	0.014	0.047	0.014	0.017	0.050	0.103	0.184	0.067	0.017	0.022	0.018	0.099	0.318	1.208	2.949
113	2.503	3.911	4.165	3.562	2.539	0.441	0.029	0.012	0.017	0.014	0.046	0.014	0.017	0.049	0.101	0.181	0.066	0.017	0.023	0.018	0.097	0.313	1.194	2.924
114	2.531	3.946	4.201	3.596	2.567	0.450	0.031	0.013	0.018	0.014	0.048	0.014	0.018	0.051	0.104	0.186	0.068	0.018	0.022	0.019	0.100	0.320	1.211	2.954
115	2.515	3.926	4.180	3.576	2.551	0.446	0.030	0.013	0.018	0.014	0.047	0.014	0.018	0.051	0.103	0.183	0.067	0.018	0.023	0.019	0.098	0.316	1.202	2.937
116	2.507	3.915	4.168	3.566	2.542	0.443	0.030	0.013	0.018	0.015	0.047	0.015	0.018	0.050	0.102	0.182	0.067	0.018	0.024	0.019	0.098	0.314	1.197	2.928
117	2.530	3.945	4.199	3.595	2.566	0.450	0.031	0.013	0.018	0.015	0.048	0.015	0.019	0.052	0.104	0.186	0.069	0.018	0.023	0.019	0.100	0.320	1.211	2.953
118	2.506	3.913	4.167	3.564	2.541	0.443	0.030	0.013	0.018	0.015	0.047	0.015	0.018	0.050	0.102	0.182	0.067	0.018	0.024	0.019	0.098	0.314	1.196	2.927
119	2.518	3.929	4.183	3.580	2.554	0.447	0.031	0.014	0.018	0.015	0.048	0.015	0.019	0.051	0.103	0.184	0.068	0.018	0.024	0.019	0.099	0.317	1.204	2.940
120	2.523	3.935	4.189	3.585	2.558	0.448	0.031	0.014	0.018	0.015	0.049	0.015	0.019	0.052	0.104	0.185	0.069	0.019	0.024	0.020	0.100	0.319	1.207	2.945
121	1.984	3.227	3.464	2.902	2.015	0.298	0.017	0.018	0.019	0.028	0.026	0.027	0.015	0.025	0.054	0.109	0.034	0.019	0.048	0.018	0.053	0.201	0.890	2.350
122	2.012	3.263	3.501	2.937	2.042	0.306	0.018	0.018	0.019	0.028	0.027	0.027	0.016	0.027	0.057	0.113	0.036	0.019	0.047	0.018	0.056	0.207	0.907	2.381
123	1.987	3.230	3.466	2.905	2.017	0.300	0.018	0.019	0.020	0.029	0.027	0.028	0.016	0.027	0.056	0.110	0.035	0.020	0.049	0.019	0.055	0.203	0.893	2.353
124	1.973	3.211	3.447	2.887	2.003	0.297	0.018	0.020	0.021	0.030	0.027	0.029	0.017	0.027	0.055	0.109	0.035	0.021	0.050	0.020	0.054	0.201	0.885	2.338
125	1.972	3.210	3.445	2.886	2.002	0.297	0.019	0.020	0.021	0.031	0.027	0.029	0.017	0.027	0.056	0.109	0.035	0.021	0.050	0.020	0.055	0.201	0.885	2.336
126	1.985	3.226	3.462	2.901	2.015	0.301	0.019	0.020	0.022	0.031	0.028	0.030	0.017	0.028	0.057	0.111	0.036	0.021	0.050	0.021	0.056	0.204	0.892	2.350
127	1.993	3.237	3.473	2.912	2.023	0.303	0.020	0.021	0.022	0.031	0.029	0.030	0.018	0.029	0.058	0.113	0.037	0.022	0.050	0.021	0.057	0.206	0.897	2.360
128	1.984	3.225	3.461	2.901	2.014	0.301	0.020	0.021	0.022	0.032	0.029	0.030	0.018	0.029	0.058	0.112	0.037	0.022	0.051	0.021	0.057	0.204	0.893	2.350
129	1.981	3.220	3.455	2.896	2.011	0.301	0.020	0.022	0.023	0.032	0.029	0.031	0.018	0.029	0.058	0.112	0.037	0.022	0.051	0.022	0.057	0.204	0.891	2.345
130	1.985	3.225	3.460	2.901	2.015	0.302	0.021	0.022	0.023	0.032	0.030	0.031	0.019	0.029	0.059	0.113	0.038	0.023	0.051	0.022	0.058	0.205	0.893	2.350
131	1.505	2.579	2.795	2.281	1.531	0.181	0.019	0.044	0.042	0.063	0.019	0.060	0.030	0.017	0.025	0.056	0.018	0.041	0.089	0.039	0.027	0.113	0.620	1.816

132	1.502	2.576	2.791	2.277	1.529	0.180	0.020	0.045	0.042	0.063	0.020	0.061	0.031	0.017	0.026	0.056	0.018	0.041	0.090	0.039	0.028	0.113	0.619	1.814
133	1.518	2.596	2.812	2.297	1.544	0.184	0.020	0.044	0.042	0.062	0.020	0.060	0.031	0.017	0.026	0.058	0.019	0.041	0.089	0.039	0.028	0.116	0.627	1.830
134	1.511	2.586	2.802	2.287	1.537	0.183	0.020	0.045	0.043	0.063	0.021	0.061	0.032	0.018	0.026	0.057	0.019	0.042	0.090	0.040	0.029	0.115	0.623	1.822
135	1.527	2.609	2.825	2.309	1.554	0.187	0.020	0.044	0.042	0.062	0.021	0.060	0.031	0.018	0.027	0.059	0.019	0.041	0.089	0.039	0.029	0.118	0.633	1.841
136	1.516	2.592	2.808	2.293	1.542	0.185	0.021	0.045	0.043	0.064	0.021	0.061	0.032	0.018	0.027	0.058	0.020	0.042	0.090	0.040	0.029	0.116	0.627	1.828
137	1.513	2.589	2.804	2.290	1.540	0.184	0.021	0.046	0.044	0.064	0.021	0.062	0.032	0.018	0.027	0.058	0.020	0.043	0.091	0.041	0.029	0.116	0.626	1.825
138	1.512	2.586	2.802	2.288	1.538	0.184	0.021	0.046	0.044	0.064	0.021	0.062	0.032	0.018	0.028	0.059	0.020	0.043	0.091	0.041	0.030	0.116	0.625	1.824
139	1.522	2.600	2.816	2.301	1.548	0.187	0.022	0.046	0.043	0.064	0.022	0.062	0.032	0.019	0.028	0.060	0.020	0.043	0.091	0.040	0.030	0.118	0.630	1.835
140	1.519	2.596	2.812	2.297	1.545	0.186	0.022	0.046	0.044	0.064	0.022	0.062	0.033	0.019	0.028	0.060	0.020	0.043	0.091	0.041	0.030	0.118	0.629	1.832
141	1.148	2.090	2.289	1.814	1.172	0.102	0.036	0.073	0.069	0.095	0.028	0.092	0.055	0.020	0.013	0.026	0.015	0.068	0.126	0.065	0.016	0.056	0.427	1.417
142	1.137	2.074	2.273	1.800	1.161	0.100	0.037	0.075	0.071	0.097	0.029	0.094	0.057	0.021	0.013	0.025	0.015	0.070	0.128	0.067	0.016	0.055	0.422	1.404
143	1.132	2.067	2.265	1.793	1.156	0.100	0.038	0.076	0.072	0.098	0.030	0.095	0.058	0.022	0.013	0.026	0.016	0.071	0.129	0.068	0.017	0.055	0.420	1.399
144	1.143	2.081	2.279	1.806	1.166	0.102	0.038	0.075	0.071	0.097	0.030	0.094	0.057	0.022	0.014	0.026	0.016	0.070	0.128	0.067	0.017	0.056	0.425	1.410
145	1.125	2.057	2.254	1.783	1.149	0.099	0.039	0.077	0.073	0.099	0.031	0.096	0.059	0.023	0.014	0.026	0.017	0.072	0.130	0.069	0.017	0.054	0.417	1.390
146	1.132	2.066	2.264	1.792	1.155	0.100	0.039	0.077	0.073	0.099	0.031	0.096	0.059	0.023	0.014	0.026	0.017	0.072	0.130	0.069	0.017	0.055	0.420	1.398
147	1.135	2.069	2.267	1.795	1.158	0.101	0.039	0.077	0.073	0.099	0.031	0.096	0.059	0.023	0.014	0.027	0.017	0.072	0.130	0.069	0.018	0.056	0.422	1.401
148	1.155	2.097	2.296	1.821	1.178	0.105	0.038	0.075	0.071	0.097	0.030	0.094	0.057	0.023	0.015	0.028	0.017	0.070	0.127	0.067	0.018	0.058	0.432	1.423
149	1.140	2.076	2.275	1.802	1.164	0.102	0.039	0.077	0.073	0.098	0.031	0.096	0.059	0.024	0.015	0.027	0.018	0.071	0.129	0.068	0.018	0.057	0.425	1.407
150	1.129	2.060	2.258	1.787	1.152	0.101	0.041	0.078	0.074	0.100	0.032	0.097	0.060	0.025	0.015	0.027	0.018	0.073	0.131	0.070	0.019	0.056	0.419	1.394
151	0.856	1.677	1.860	1.424	0.877	0.050	0.064	0.108	0.103	0.133	0.051	0.129	0.088	0.041	0.015	0.014	0.029	0.102	0.166	0.098	0.022	0.022	0.280	1.085
152	0.848	1.665	1.847	1.413	0.869	0.049	0.065	0.110	0.105	0.134	0.052	0.131	0.089	0.042	0.016	0.014	0.030	0.103	0.167	0.099	0.023	0.021	0.276	1.076
153	0.844	1.659	1.841	1.408	0.865	0.049	0.066	0.111	0.105	0.135	0.053	0.132	0.090	0.043	0.016	0.014	0.031	0.104	0.168	0.100	0.023	0.021	0.274	1.071
154	0.846	1.662	1.844	1.411	0.867	0.050	0.066	0.111	0.105	0.135	0.053	0.132	0.090	0.043	0.017	0.015	0.031	0.104	0.168	0.100	0.023	0.022	0.276	1.074
155	0.850	1.666	1.849	1.415	0.871	0.051	0.066	0.111	0.105	0.135	0.053	0.132	0.090	0.043	0.017	0.015	0.031	0.104	0.168	0.100	0.024	0.022	0.278	1.078
156	0.856	1.674	1.857	1.423	0.877	0.052	0.065	0.110	0.105	0.134	0.053	0.131	0.089	0.043	0.017	0.015	0.031	0.103	0.167	0.100	0.024	0.023	0.281	1.084
157	0.855	1.673	1.855	1.421	0.876	0.052	0.066	0.110	0.105	0.135	0.053	0.131	0.090	0.043	0.017	0.016	0.032	0.104	0.168	0.100	0.024	0.023	0.281	1.083
158	0.842	1.654	1.835	1.403	0.863	0.050	0.068	0.113	0.108	0.137	0.055	0.134	0.092	0.045	0.018	0.016	0.033	0.106	0.170	0.102	0.025	0.023	0.274	1.068
159	0.840	1.651	1.832	1.401	0.861	0.050	0.068	0.113	0.108	0.137	0.055	0.134	0.092	0.046	0.019	0.016	0.034	0.107	0.171	0.103	0.026	0.023	0.274	1.066

160	0.855	1.671	1.853	1.420	0.875	0.052	0.067	0.111	0.106	0.136	0.054	0.132	0.091	0.044	0.018	0.016	0.033	0.105	0.169	0.101	0.025	0.024	0.281	1.082
161	1.337	2.357	2.567	2.067	1.362	0.139	0.020	0.050	0.046	0.070	0.016	0.067	0.034	0.012	0.014	0.037	0.011	0.045	0.099	0.043	0.016	0.081	0.525	1.630
162	1.326	2.341	2.550	2.052	1.351	0.136	0.021	0.051	0.047	0.071	0.017	0.069	0.035	0.012	0.014	0.036	0.011	0.046	0.101	0.044	0.016	0.079	0.519	1.617
163	1.330	2.347	2.556	2.058	1.355	0.138	0.021	0.051	0.048	0.071	0.017	0.069	0.035	0.012	0.014	0.037	0.011	0.047	0.100	0.044	0.017	0.080	0.522	1.622
164	1.327	2.343	2.552	2.054	1.352	0.137	0.021	0.051	0.048	0.072	0.018	0.069	0.035	0.013	0.014	0.037	0.012	0.047	0.101	0.044	0.017	0.080	0.521	1.619
165	1.320	2.332	2.541	2.044	1.345	0.136	0.022	0.052	0.049	0.073	0.018	0.070	0.036	0.013	0.015	0.036	0.012	0.048	0.102	0.045	0.017	0.079	0.517	1.610
166	1.338	2.356	2.566	2.067	1.362	0.140	0.021	0.051	0.048	0.071	0.018	0.069	0.035	0.013	0.015	0.038	0.012	0.047	0.100	0.044	0.018	0.082	0.526	1.630
167	1.328	2.342	2.551	2.054	1.353	0.138	0.022	0.052	0.049	0.072	0.018	0.070	0.036	0.013	0.015	0.038	0.012	0.048	0.102	0.045	0.018	0.081	0.521	1.619
168	1.324	2.337	2.545	2.049	1.349	0.137	0.022	0.053	0.049	0.073	0.019	0.071	0.037	0.013	0.015	0.037	0.012	0.048	0.102	0.046	0.018	0.080	0.519	1.615
169	1.338	2.356	2.566	2.067	1.363	0.141	0.022	0.052	0.048	0.072	0.019	0.069	0.036	0.013	0.016	0.039	0.013	0.047	0.101	0.045	0.018	0.083	0.527	1.631
170	1.347	2.369	2.578	2.079	1.372	0.143	0.022	0.051	0.048	0.071	0.019	0.069	0.036	0.014	0.016	0.040	0.013	0.047	0.100	0.044	0.019	0.084	0.532	1.641
171	2.150	3.453	3.697	3.118	2.183	0.338	0.014	0.010	0.011	0.018	0.026	0.016	0.010	0.027	0.063	0.126	0.038	0.011	0.034	0.011	0.061	0.231	0.984	2.536
172	2.143	3.443	3.686	3.108	2.175	0.336	0.014	0.010	0.012	0.018	0.026	0.017	0.010	0.027	0.063	0.125	0.038	0.011	0.035	0.012	0.061	0.230	0.980	2.527
173	2.130	3.426	3.669	3.093	2.163	0.333	0.014	0.010	0.012	0.019	0.026	0.017	0.010	0.026	0.062	0.124	0.037	0.012	0.036	0.012	0.060	0.227	0.972	2.513
174	2.136	3.434	3.677	3.100	2.169	0.335	0.015	0.010	0.012	0.019	0.026	0.018	0.010	0.027	0.063	0.125	0.038	0.012	0.036	0.012	0.061	0.229	0.976	2.520
175	2.129	3.424	3.667	3.091	2.162	0.333	0.015	0.010	0.012	0.019	0.026	0.018	0.010	0.027	0.062	0.124	0.038	0.012	0.036	0.012	0.060	0.227	0.972	2.512
176	2.124	3.418	3.660	3.085	2.157	0.332	0.015	0.011	0.012	0.019	0.026	0.018	0.010	0.027	0.062	0.124	0.037	0.012	0.037	0.012	0.060	0.227	0.969	2.507
177	2.138	3.436	3.679	3.102	2.171	0.336	0.015	0.011	0.012	0.019	0.027	0.018	0.011	0.027	0.064	0.126	0.039	0.012	0.036	0.012	0.062	0.230	0.978	2.522
178	2.137	3.433	3.676	3.100	2.169	0.336	0.015	0.011	0.013	0.019	0.027	0.018	0.011	0.028	0.064	0.126	0.039	0.013	0.037	0.013	0.062	0.230	0.977	2.520
179	2.151	3.452	3.695	3.118	2.184	0.340	0.016	0.011	0.013	0.020	0.028	0.018	0.011	0.028	0.065	0.128	0.040	0.013	0.036	0.013	0.063	0.233	0.985	2.536
180	2.155	3.457	3.700	3.122	2.187	0.341	0.016	0.011	0.013	0.020	0.028	0.018	0.011	0.029	0.066	0.129	0.040	0.013	0.036	0.013	0.064	0.234	0.988	2.540
181	3.053	4.627	4.898	4.257	3.094	0.606	0.051	0.018	0.025	0.013	0.077	0.014	0.030	0.084	0.159	0.268	0.109	0.026	0.008	0.028	0.151	0.442	1.525	3.529
182	3.041	4.611	4.881	4.241	3.082	0.602	0.051	0.018	0.025	0.013	0.076	0.014	0.030	0.083	0.158	0.266	0.108	0.026	0.008	0.028	0.150	0.439	1.518	3.516
183	3.053	4.627	4.898	4.257	3.094	0.606	0.052	0.018	0.025	0.013	0.077	0.014	0.030	0.084	0.159	0.268	0.109	0.026	0.009	0.028	0.151	0.443	1.526	3.530
184	3.071	4.649	4.920	4.279	3.112	0.612	0.053	0.019	0.026	0.014	0.079	0.015	0.031	0.086	0.162	0.271	0.111	0.027	0.009	0.029	0.154	0.447	1.537	3.549
185	3.051	4.623	4.894	4.254	3.092	0.606	0.052	0.018	0.026	0.014	0.077	0.015	0.030	0.084	0.159	0.268	0.109	0.026	0.009	0.029	0.151	0.442	1.524	3.527
186	3.062	4.638	4.908	4.268	3.103	0.610	0.053	0.019	0.026	0.014	0.079	0.015	0.031	0.086	0.161	0.270	0.111	0.027	0.009	0.029	0.153	0.445	1.532	3.539
187	3.050	4.622	4.892	4.252	3.091	0.605	0.052	0.018	0.026	0.014	0.077	0.015	0.030	0.084	0.159	0.268	0.109	0.026	0.009	0.029	0.151	0.442	1.524	3.525

188	3.083	4.664	4.935	4.293	3.124	0.616	0.054	0.020	0.027	0.015	0.080	0.016	0.032	0.088	0.164	0.274	0.113	0.028	0.009	0.030	0.156	0.451	1.545	3.562
189	3.044	4.614	4.885	4.245	3.085	0.604	0.052	0.019	0.026	0.014	0.077	0.015	0.031	0.084	0.159	0.267	0.109	0.027	0.009	0.029	0.151	0.441	1.521	3.519
190	3.049	4.620	4.891	4.251	3.090	0.606	0.053	0.019	0.026	0.015	0.078	0.015	0.031	0.085	0.160	0.268	0.110	0.027	0.010	0.029	0.152	0.443	1.524	3.525
191	2.084	3.364	3.605	3.034	2.114	0.323	0.015	0.011	0.013	0.021	0.025	0.020	0.010	0.026	0.060	0.119	0.036	0.013	0.039	0.013	0.058	0.219	0.947	2.462
192	2.085	3.366	3.607	3.035	2.115	0.324	0.015	0.012	0.014	0.022	0.026	0.020	0.011	0.026	0.060	0.120	0.036	0.013	0.039	0.013	0.058	0.220	0.948	2.463
193	2.107	3.394	3.636	3.063	2.137	0.330	0.016	0.012	0.014	0.021	0.027	0.020	0.011	0.027	0.062	0.123	0.038	0.013	0.038	0.013	0.060	0.225	0.961	2.487
194	2.099	3.383	3.624	3.052	2.129	0.328	0.016	0.012	0.014	0.022	0.027	0.021	0.011	0.027	0.062	0.122	0.038	0.014	0.039	0.014	0.060	0.223	0.956	2.478
195	2.134	3.429	3.671	3.096	2.164	0.337	0.017	0.012	0.014	0.021	0.028	0.020	0.011	0.029	0.065	0.127	0.040	0.014	0.038	0.014	0.063	0.231	0.977	2.516
196	2.129	3.422	3.665	3.090	2.159	0.336	0.017	0.012	0.014	0.021	0.028	0.020	0.012	0.029	0.065	0.127	0.040	0.014	0.038	0.014	0.063	0.230	0.974	2.511
197	2.109	3.396	3.638	3.065	2.140	0.331	0.017	0.012	0.014	0.022	0.028	0.021	0.012	0.028	0.063	0.125	0.039	0.014	0.040	0.014	0.061	0.226	0.963	2.489
198	2.105	3.390	3.632	3.060	2.135	0.330	0.017	0.013	0.015	0.023	0.028	0.021	0.012	0.028	0.063	0.124	0.039	0.014	0.040	0.014	0.061	0.226	0.961	2.485
199	2.098	3.381	3.622	3.051	2.129	0.329	0.017	0.013	0.015	0.023	0.028	0.022	0.012	0.028	0.063	0.123	0.039	0.015	0.040	0.015	0.061	0.224	0.957	2.477
200	2.093	3.373	3.614	3.043	2.123	0.327	0.017	0.013	0.015	0.023	0.028	0.022	0.012	0.028	0.063	0.123	0.038	0.015	0.041	0.015	0.060	0.223	0.953	2.471
201	1.173	2.124	2.325	1.847	1.197	0.107	0.034	0.070	0.066	0.092	0.026	0.089	0.053	0.019	0.014	0.028	0.015	0.065	0.123	0.062	0.016	0.060	0.441	1.444
202	1.180	2.133	2.334	1.856	1.204	0.109	0.034	0.070	0.066	0.091	0.026	0.089	0.052	0.019	0.014	0.028	0.015	0.065	0.122	0.062	0.016	0.061	0.444	1.452
203	1.192	2.150	2.351	1.871	1.216	0.112	0.034	0.069	0.065	0.091	0.026	0.088	0.052	0.019	0.014	0.030	0.015	0.064	0.121	0.061	0.017	0.063	0.451	1.465
204	1.170	2.118	2.318	1.841	1.194	0.108	0.036	0.072	0.068	0.094	0.028	0.091	0.054	0.021	0.015	0.029	0.016	0.067	0.124	0.064	0.017	0.060	0.440	1.440
205	1.189	2.145	2.346	1.867	1.213	0.112	0.034	0.070	0.066	0.092	0.027	0.089	0.053	0.020	0.015	0.030	0.015	0.065	0.122	0.062	0.018	0.063	0.450	1.462
206	1.190	2.146	2.347	1.868	1.214	0.112	0.035	0.070	0.067	0.092	0.027	0.089	0.053	0.020	0.015	0.030	0.016	0.065	0.122	0.062	0.018	0.063	0.451	1.463
207	1.189	2.145	2.346	1.867	1.213	0.112	0.035	0.071	0.067	0.092	0.027	0.089	0.053	0.020	0.015	0.031	0.016	0.066	0.123	0.063	0.018	0.064	0.451	1.462
208	1.198	2.156	2.357	1.878	1.222	0.114	0.035	0.070	0.066	0.092	0.027	0.089	0.053	0.020	0.016	0.031	0.016	0.065	0.122	0.062	0.018	0.065	0.455	1.471
209	1.189	2.144	2.344	1.866	1.213	0.113	0.036	0.071	0.068	0.093	0.029	0.090	0.054	0.021	0.016	0.031	0.017	0.067	0.123	0.064	0.019	0.064	0.451	1.462
210	1.194	2.150	2.351	1.872	1.217	0.114	0.036	0.071	0.067	0.093	0.028	0.090	0.054	0.021	0.016	0.032	0.017	0.066	0.123	0.063	0.019	0.065	0.454	1.467
211	0.632	1.323	1.486	1.101	0.649	0.042	0.118	0.166	0.160	0.191	0.103	0.187	0.143	0.092	0.058	0.041	0.078	0.158	0.224	0.154	0.065	0.028	0.189	0.821
212	0.631	1.321	1.484	1.099	0.648	0.043	0.119	0.166	0.161	0.191	0.104	0.188	0.144	0.093	0.059	0.042	0.079	0.159	0.225	0.155	0.066	0.029	0.189	0.820
213	0.626	1.313	1.475	1.092	0.643	0.043	0.120	0.168	0.163	0.193	0.105	0.190	0.146	0.095	0.060	0.043	0.080	0.161	0.227	0.157	0.068	0.029	0.188	0.814
214	0.625	1.311	1.473	1.090	0.642	0.043	0.121	0.169	0.164	0.194	0.107	0.191	0.147	0.096	0.061	0.044	0.081	0.162	0.228	0.158	0.069	0.030	0.188	0.813
215	0.620	1.303	1.464	1.083	0.637	0.044	0.123	0.171	0.165	0.196	0.108	0.192	0.149	0.097	0.062	0.045	0.082	0.163	0.230	0.159	0.070	0.030	0.186	0.807

216	0.637	1.328	1.491	1.107	0.654	0.045	0.119	0.167	0.162	0.192	0.105	0.188	0.145	0.094	0.060	0.044	0.080	0.160	0.226	0.156	0.068	0.031	0.193	0.827
217	0.639	1.330	1.492	1.108	0.656	0.046	0.120	0.167	0.162	0.192	0.105	0.189	0.146	0.095	0.061	0.045	0.080	0.160	0.226	0.156	0.068	0.031	0.195	0.828
218	0.625	1.309	1.470	1.089	0.642	0.045	0.123	0.171	0.165	0.196	0.108	0.192	0.149	0.098	0.063	0.046	0.083	0.164	0.230	0.159	0.071	0.032	0.189	0.812
219	0.647	1.342	1.505	1.119	0.664	0.047	0.119	0.167	0.161	0.191	0.105	0.188	0.145	0.094	0.061	0.045	0.080	0.159	0.225	0.155	0.068	0.032	0.199	0.838
220	0.640	1.331	1.493	1.110	0.657	0.047	0.121	0.168	0.163	0.193	0.107	0.190	0.147	0.096	0.062	0.046	0.082	0.161	0.227	0.157	0.070	0.033	0.196	0.830
221	0.156	0.519	0.624	0.382	0.166	0.088	0.292	0.346	0.340	0.372	0.273	0.368	0.322	0.260	0.211	0.170	0.241	0.338	0.405	0.333	0.220	0.110	0.041	0.246
222	0.160	0.526	0.632	0.388	0.170	0.087	0.290	0.344	0.338	0.370	0.271	0.367	0.320	0.259	0.209	0.168	0.239	0.336	0.403	0.331	0.218	0.109	0.042	0.251
223	0.161	0.527	0.634	0.389	0.171	0.087	0.290	0.344	0.338	0.370	0.271	0.367	0.320	0.259	0.209	0.169	0.239	0.336	0.403	0.331	0.218	0.109	0.042	0.252
224	0.161	0.527	0.633	0.389	0.171	0.088	0.291	0.345	0.339	0.371	0.272	0.367	0.321	0.259	0.210	0.169	0.239	0.336	0.404	0.331	0.219	0.110	0.043	0.252
225	0.160	0.523	0.629	0.387	0.170	0.090	0.293	0.347	0.341	0.373	0.274	0.369	0.323	0.261	0.212	0.171	0.241	0.338	0.405	0.333	0.221	0.112	0.043	0.251
226	0.162	0.526	0.632	0.389	0.171	0.090	0.292	0.346	0.340	0.372	0.274	0.368	0.322	0.261	0.212	0.171	0.241	0.338	0.405	0.333	0.220	0.112	0.044	0.253
227	0.161	0.524	0.630	0.388	0.171	0.091	0.294	0.348	0.342	0.373	0.275	0.370	0.323	0.262	0.213	0.172	0.242	0.339	0.406	0.334	0.222	0.113	0.045	0.252
228	0.164	0.530	0.636	0.392	0.174	0.091	0.292	0.346	0.340	0.372	0.274	0.368	0.322	0.261	0.212	0.171	0.241	0.338	0.405	0.333	0.220	0.112	0.045	0.255
229	0.164	0.529	0.634	0.392	0.174	0.091	0.293	0.347	0.341	0.373	0.274	0.369	0.323	0.262	0.213	0.172	0.242	0.338	0.406	0.333	0.221	0.113	0.046	0.255
230	0.165	0.531	0.637	0.394	0.175	0.092	0.293	0.347	0.341	0.373	0.274	0.369	0.323	0.261	0.213	0.172	0.242	0.338	0.405	0.333	0.221	0.113	0.047	0.257
231	0.069	0.138	0.181	0.101	0.074	0.352	0.559	0.603	0.599	0.623	0.545	0.620	0.584	0.534	0.491	0.452	0.516	0.595	0.646	0.591	0.496	0.383	0.199	0.076
232	0.070	0.140	0.184	0.103	0.074	0.350	0.557	0.600	0.597	0.621	0.542	0.618	0.581	0.531	0.489	0.450	0.514	0.593	0.644	0.589	0.494	0.381	0.197	0.077
233	0.071	0.140	0.183	0.103	0.076	0.353	0.560	0.603	0.599	0.623	0.545	0.620	0.584	0.534	0.492	0.453	0.516	0.596	0.646	0.591	0.496	0.384	0.200	0.078
234	0.071	0.144	0.188	0.106	0.076	0.349	0.556	0.599	0.595	0.619	0.541	0.616	0.580	0.530	0.487	0.449	0.512	0.592	0.642	0.587	0.492	0.379	0.197	0.079
235	0.072	0.148	0.192	0.108	0.076	0.346	0.552	0.596	0.592	0.616	0.538	0.613	0.577	0.527	0.484	0.445	0.509	0.589	0.640	0.584	0.489	0.376	0.195	0.081
236	0.074	0.146	0.190	0.108	0.078	0.350	0.556	0.600	0.596	0.620	0.542	0.617	0.581	0.531	0.488	0.450	0.513	0.592	0.643	0.588	0.493	0.380	0.199	0.082
237	0.074	0.149	0.193	0.110	0.078	0.348	0.554	0.598	0.594	0.618	0.540	0.615	0.578	0.529	0.486	0.447	0.511	0.590	0.641	0.586	0.491	0.378	0.197	0.082
238	0.075	0.150	0.194	0.111	0.079	0.349	0.555	0.598	0.594	0.618	0.540	0.615	0.579	0.529	0.487	0.448	0.511	0.591	0.642	0.586	0.491	0.379	0.198	0.083
239	0.076	0.153	0.197	0.113	0.080	0.348	0.553	0.597	0.593	0.617	0.539	0.614	0.578	0.528	0.485	0.447	0.510	0.590	0.640	0.585	0.490	0.378	0.198	0.085
240	0.077	0.152	0.196	0.114	0.081	0.350	0.556	0.599	0.595	0.619	0.541	0.616	0.580	0.530	0.488	0.449	0.512	0.592	0.642	0.587	0.492	0.380	0.201	0.086