1a. Excel Program Input/Output

Module 1a shows the excel program input values and output solution. Excel solver is used for this particular model. Since the objective function is linear, we can choose 'Simplex LP' or 'GRG Nonlinear' as the solver methodology.

The following diagrams are of both the cases that were mentioned in module 1. Case 1 is with only 2 generators at node 2 and 3. Case 2 is with 3 generators at all the nodes.

Case 1 – 2 generators

Input -

Total cost (\$/h):	0		
	Cost(\$∕h)		
Generator 2:	0		
Generator 3:	0		
Required delivery (MW):	920		
Planned delivery (MW):	0		
	Device Diese i (h.4) (h.4)	1	
	Power= P_gen_I (MW)	Lower Dound	Upper bound
Generator 2:	0	0	
Generator 3:	0	0	
theta 1:	0	-3.141592654	3.141592654
theta 2:	0	-3.141592654	3 141592654
theta 3:	0	-3.141592654	3.141592654
-	_		
100[B×]	1	2	3
1	1800	-1000	-800
2	-1000	1500	-500
3	-800	-500	1300
	(MW)		
P load 1	270		
P load 2	550		
P load 3	100		
	DO (1 4 1 4		
	DC power flow formulation		
Bus_1	U		
Bus_2	0		
Bus_3	0		
	(MW)	Line Reactance (ohms)	Transmision Limit
P_flow_12	0	0.1	210
P_flow_21	0		210
- flam 12	0	0.125	
p_now_is	0		

Output –

Total cost (\$/h):	7233.1		
	Cost(\$/h)		
Generator 2:	6495.875		
Generator 3:	737.225		
Required delivery (MW):	920		
Planned delivery (MW):	920		
	Power= P_gen_i (MW)	Lower bound	Upper bound
Generator 2:	827 5	Ω	
Generator 3:	925	0	
theta 1:	0	-3 141592654	3 141592654
theta 2:	0.21	-3 141592654	3 141592654
theta 3:	0.075	-3 141592654	3 141592654
	0.010	0.111002001	0.111002001
100[Bx]	1	2	3
1	1800	-1000	-800
2	-1000	1500	-500
3	-800	-500	1300
	(MW)		
P_load_1	270		
P_load_2	550		
P_load_3	100		
	DC power flow formulation		
Bus_1	270		
Bus_2	550		
Bus_3	100		
	0.8.0		T
D 9	(MW)	Line Heactance (ohms)	i ransmision Limit
P_flow_12	-210	0.1	210
P_flow_21	210	0.105	210
	-60	0.125	
p_now_23	67.5	0.2	

Case 2 – 3 generators

Input –

Total cost (\$/h):	0		
	Cost(\$/b)		
Generator 1:	0		
Generator 2:	0		
Generator 2:	0		
Generatorio.	0		
Demised delivery (NA) ().	000		
Required delivery (MW):	920		
Planned delivery [MW]:	U		
	Power= P_gen_i (MW)	Lower bound	Upper bound
Generator 1:	0	0	
Generator 2:	0	0	
Generator 3:	0	0	
theta_1:	0	-3.141592654	3.141592654
theta_2:	0	-3.141592654	3.141592654
theta 3:	0	-3.141592654	3.141592654
100(B×1	1	2	3
1	1800	-1000	-800
2	-1000	1500	-500
2	- 1000	-500	1200
5	-000	-300	1300
	(MW)		
P load 1	270		
P load 2	550		
1_000_2	100		
F_10au_3	100		
	DC power flow formulation		
Bus 1	ροποι ποι rom rom aid(for Ω		
	0 0		
Dus_2	0		
DUS_3	U		
	(MW)	Line Reactance (obmo)	Transmision Limit
D flow 12	0		210
F_NOW_12	0	0.1	210
P_flow_21	U	0.405	210
p_flow_13	U	0.125	
p_flow_23	0	0.2	

Output –

		I	
Total cost (\$/h):	7225.984615		
	Cost(th)		
Generator 1	450.9207692		
Generator 1.	6775 15204C		
Generator 2:	0770.103040		
Generator 5.	0		
Bequired delivery (MW):	920		
Planned delivery (MW):	920		
	B B 10.0.0		
Concertor 1	Fower= P_gen_i (MW)	Lower bound	Upper bound
Generator I:	060.0700001	U	
Generator 2:	005.0769231	U	
there to	U 0	U 2 141502054	2 141502054
theta_i:	0.21	-3.141032604	3. 14 1032604
theta_2:	0.021	-3.141032604	3.141332634
theta_5.	0.003646134	-3. 14 1932 694	3.141332634
100(B×1	1	2	3
1	1800	-1000	-800
2	-1000	1500	-500
3	-800	-500	1300
	(MW)		
P_load_1	270		
P_load_2	550		
P_load_3	100		
	DC power flow formulation		
Bus 1	270		
Bus 2	550		
Bus_3	100		
	(MW)	Line Reactance (ohms)	Transmision Limit
P_flow_12	-210	0.1	210
P_flow_21	210		210
p_flow_13	-3.076923077	0.125	
p_flow_23	103.0769231	0.2	

Note – The total production cost decreases when we add generator at node 1 because the marginal cost of this generator is lower than G3 and the total demand is met by a combination of G2 and G1.