Garver Network Analysis

The network studied in this project is a 6-bus system, with information taken from references [3], [2], and [1]. The network is isolated, focusing solely on load demands, excluding overloads on other lines and network expansion requirements.

Figure 1 shows the network diagram, as outlined in [1]. The buses and lines' details are given in Tables 1 and 2.

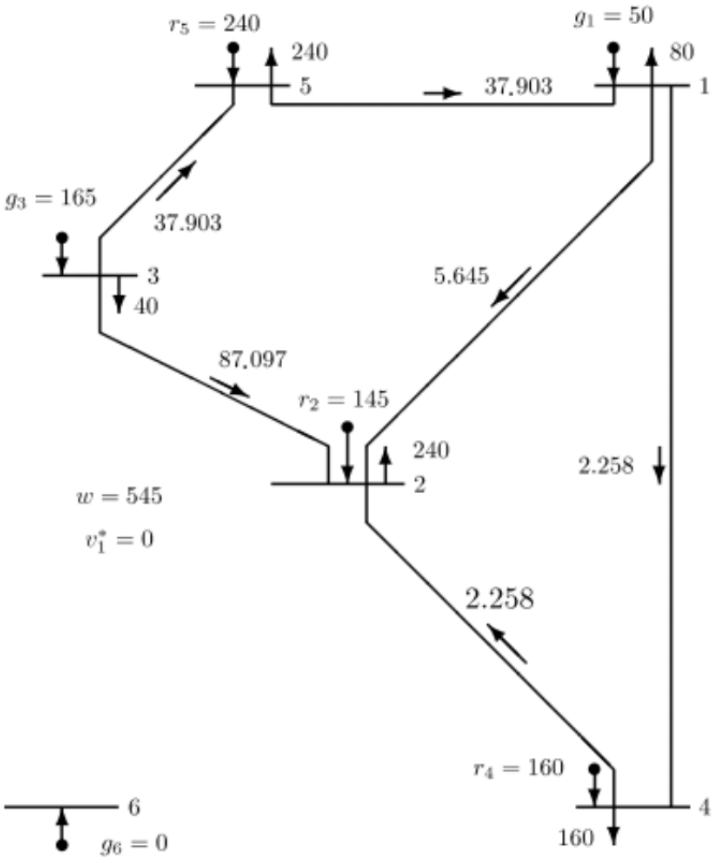

Figure 1: Diagram of the 6-bus Garver network

Table 1: Bus Information for 6-Bus Network

Bus Number	Load (MW)	Generation (MW)
1	0	0
2	248	5
3	560	48
4	168	5
5	248	5
6	40	8

Table 2: Line Information for 6-Bus Network

From Bus	To Bus	R (p.u.)	X (p.u.)	Capacity (MW)	Status	Cost ($1000)
1	2	0.10	0.40	188	1	48
1	3	0.15	0.60	88	1	30
1	4	0.85	0.20	188	1	68
1	5	0.80	0.40	188	1	28
1	6	0.85	0.60	88	1	60
2	3	0.85	0.20	188	2	28
2	4	0.40	0.80	188	2	48
2	5	0.80	0.31	188	2	31
2	6	0.80	0.30	188	2	38
3	4	0.15	0.50	208	3	50
3	5	0.25	0.20	188	3	28
3	6	0.12	0.40	188	3	40
4	5	0.16	0.63	208	4	63
4	6	0.30	0.30	188	4	38
5	6	0.15	0.61	208	5	61

References

[1] Lee, Kwang Y., and Mohamed A. El-Sharkawi, eds. *Modern heuristic optimization techniques: theory and applications to power systems*. Vol. 39. John Wiley & Sons, 2008.

[2] Garver, Len L. "Transmission network estimation using linear programming." *IEEE Transactions on Power Apparatus and Systems* 7 (1970): 1688-1697.

[3] Romero, R., et al. "Test systems and mathematical models for transmission network expansion planning." *IEE Proceedings-Generation, Transmission and Distribution* 149.1 (2002): 27-36.