

Data for Six-bus System

The one-line diagram is shown in Fig.1. The unit data and line data are shown in Table 1 and Table 2, respectively. Table 3 presents the load and uncertainty information. Column “Base Load” shows the hourly forecasted load. Assume that the load distributions are 20%, 40%, and 40% for Bus 3, Bus 4, and Bus 5, respectively. $\bar{u}_{1,t}$ and $\bar{u}_{3,t}$ in Table 3 are the bounds of the uncertainties at Bus 1 and Bus 3, respectively. The uncertainty bounds at other buses are 0.

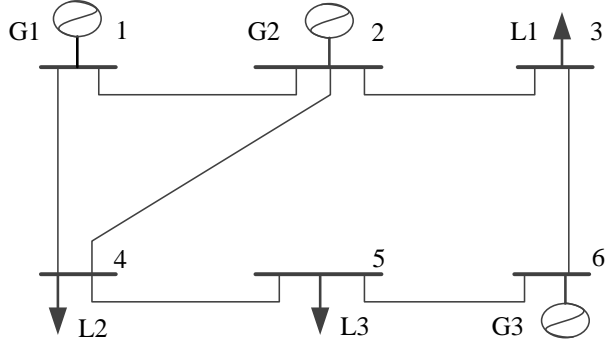


Figure 1: One-line Diagram for 6-bus system

Table 1: Unit Data for the 6-bus System

#	P^{\min}	P^{\max}	P_0	a	b	c	R^u	R^d	C_u	C_d	T^{on}	T^{off}	T_0
1	100	220	120	0.004	13.5	176.9	24	24	180	50	4	4	4
2	10	100	50	0.001	32.6	129.9	12	12	360	40	3	2	3
6	10	20	0	0.005	17.6	137.4	5	5	60	0	1	1	-2

P^{\min}, P^{\max}, P_0 : min/max/initial generation level (MW);

fuel cost (\$): $aP^2 + bP + c$;

R^u, R^d : ramping up/down rate (MW/h);

C_u, C_d : startup/shutdown cost (\$);

$T^{\text{on}}, T^{\text{off}}, T_0$: min on/min off/initial time (h)

Table 2: Line Data for the 6-bus System

from	1	1	2	5	3	2	4
to	2	4	4	6	6	3	5
x(p.u.)	0.17	0.258	0.197	0.14	0.018	0.037	0.037
capacity(MW)	200	100	100	100	100	200	200

Table 3: Load and Uncertainty Data for the 6-bus System (MW)

Time (h)	Base Load	$\bar{u}_{1,t}$	$\bar{u}_{3,t}$	Time (h)	Base Load	$\bar{u}_{1,t}$	$\bar{u}_{3,t}$
1	175.19	1.09	0.29	13	242.18	19.68	5.25
2	165.15	2.06	0.55	14	243.6	21.32	5.68
3	158.67	2.98	0.79	15	248.86	23.33	6.22
4	154.73	3.87	1.03	16	255.79	25.58	6.82
5	155.06	4.85	1.29	17	256	27.2	7.25
6	160.48	6.02	1.6	18	246.74	27.76	7.4
7	173.39	7.59	2.02	19	245.97	29.21	7.79
8	177.6	8.88	2.37	20	237.35	29.67	7.91
9	186.81	10.51	2.8	21	237.31	31.15	8.31
10	206.96	12.94	3.45	22	232.67	31.99	8.53
11	228.61	15.72	4.19	23	195.93	28.16	7.51
12	236.1	17.71	4.72	24	195.6	29.34	7.82

Table 4: Marginal Costs at Different Generation Levels (\$/MWh)

Gen. 1			Gen. 2			Gen. 3		
\underline{P}_1^w	\bar{P}_1^w	mar. cost	\underline{P}_2^w	\bar{P}_2^w	mar. cost	\underline{P}_3^w	\bar{P}_3^w	mar. cost
100	124	14.396	10	28	32.638	10	12	17.71
124	148	14.588	28	46	32.674	12	14	17.73
148	172	14.78	46	64	32.71	14	16	17.75
172	196	14.972	64	82	32.746	16	18	17.77
196	220	15.164	82	100	32.782	18	20	17.79