

# 1 Bus data

Bus No.	Bus type	Voltage magnitude,  V  (pu)	Base Voltage (kV)	Voltage angle, $\theta$ (rad)	Generated power (MW)	Generated power (Mvar)	Load power (MW)	Load power (Mvar)	Shunt conductance (pu)	Shunt susceptance (pu)
1	1	1	135	0	0	0	0	0	0	0
2	2	1	135	0	60.97	0	21.7	12.7	0	0
3	3	1	135	0	0	0	2.4	1.2	0	0
4	3	1	135	0	0	0	7.6	1.6	0	0
5	3	1	135	0	0	0	0	0	0	0.0019
6	3	1	135	0	0	0	0	0	0	0
7	3	1	135	0	0	0	22.8	10.9	0	0
8	3	1	135	0	0	0	30	30	0	0
9	3	1	135	0	0	0	0	0	0	0
10	3	1	135	0	0	0	5.8	2	0	0
11	3	1	135	0	0	0	0	0	0	0
12	3	1	135	0	0	0	11.2	7.5	0	0
13	2	1	135	0	37	0	0	0	0	0
14	3	1	135	0	0	0	6.2	1.6	0	0
15	3	1	135	0	0	0	8.2	2.5	0	0
16	3	1	135	0	0	0	3.5	1.8	0	0
17	3	1	135	0	0	0	9	5.8	0	0
18	3	1	135	0	0	0	3.2	0.9	0	0
19	3	1	135	0	0	0	9.5	3.4	0	0
20	3	1	135	0	0	0	2.2	0.7	0	0
21	3	1	135	0	0	0	17.5	11.2	0	0
22	2	1	135	0	21.59	0	0	0	0	0
23	2	1	135	0	19.2	0	3.2	1.6	0	0
24	3	1	135	0	0	0	8.7	6.7	0	0.0004
25	3	1	135	0	0	0	0	0	0	0
26	3	1	135	0	0	0	3.5	2.3	0	0
27	2	1	135	0	26.91	0	0	0	0	0
28	3	1	135	0	0	0	0	0	0	0
29	3	1	135	0	0	0	2.4	0.9	0	0
30	3	1	135	0	0	0	10.6	1.9	0	0

Bus type	
Number	Description
1	Slack
2	PV
3	PQ

## 2 Line data

Branch number	From bus	To bus	R (pu)	X (pu)	B/2 (pu)
1	1	2	0.02	0.06	0.015
2	1	3	0.05	0.19	0.01
3	2	4	0.06	0.17	0.01
4	3	4	0.01	0.04	0
5	2	5	0.05	0.2	0.01
6	2	6	0.06	0.18	0.01
7	4	6	0.01	0.04	0
8	5	7	0.05	0.12	0.005
9	6	7	0.03	0.08	0.005
10	6	8	0.01	0.04	0
11	6	9	0	0.21	0
12	6	10	0	0.56	0
13	9	11	0	0.21	0
14	9	10	0	0.11	0
15	4	12	0	0.26	0
16	12	13	0	0.14	0
17	12	14	0.12	0.26	0
18	12	15	0.07	0.13	0
19	12	16	0.09	0.2	0
20	14	15	0.22	0.2	0
21	16	17	0.08	0.19	0
22	15	18	0.11	0.22	0
23	18	19	0.06	0.13	0
24	19	20	0.03	0.07	0
25	10	20	0.09	0.21	0
26	10	17	0.03	0.08	0
27	10	21	0.03	0.07	0
28	10	22	0.07	0.15	0
29	21	22	0.01	0.02	0
30	15	23	0.1	0.2	0
31	22	24	0.12	0.18	0
32	23	24	0.13	0.27	0
33	24	25	0.19	0.33	0
34	25	26	0.25	0.39	0
35	25	27	0.11	0.21	0
36	28	27	0	0.4	0
37	27	29	0.22	0.42	0
38	27	30	0.32	0.6	0
39	29	30	0.24	0.45	0
40	8	28	0.06	0.2	0.01
41	6	28	0.02	0.06	0.005