

P5.4 The data for a 13 machine, 71 bus, 94 line system is given. Obtain the load flow solution.

Data :

No. of buses	71
No. of lines	94
Base power (MVA)	200
No. of machines	13
No. of shunt loads	23

BUS NO	GENERATION		LOAD	POWER
1	-	-	0.0	0.0
2	0.0	0.0	0.0	0.0
3	506.0	150.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	100.0	32.0	0.0	0.0
7	0.0	0.0	12.8	8.3
8	300.0	125.0	0.0	0.0
9	0.0	0.0	185.0	130.0
10	0.0	0.0	80.0	50.0
11	0.0	0.0	155.0	96.0
12	0.0	0.0	0.0	0.0

Contd....

BUS NO	GENERATION		LOAD	POWER
13	0.0	0.0	100.0	62.0
14	0.0	0.0	0.0	0.0
15	180.0	110.0	0.0	0.0
16	0.0	0.0	73.0	45.5
17	0.0	0.0	36.0	22.4
18	0.0	0.0	16.0	9.0
19	0.0	0.0	32.0	19.8
20	0.0	0.0	27.0	16.8
21	0.0	0.0	32.0	19.8
22	0.0	0.0	0.0	0.0
23	0.0	0.0	75.0	46.6
24	0.0	0.0	0.0	0.0
25	0.0	0.0	133.0	82.5
26	0.0	0.0	0.0	0.0
27	300.0	75.0	0.0	0.0
28	0.0	0.0	30.0	20.0
29	260.0	70.0	0.0	0.0
30	0.0	0.0	120.0	0.0
31	0.0	0.0	160.0	74.5
32	0.0	0.0	0.0	99.4
33	0.0	0.0	0.0	0.0
34	0.0	0.0	112.0	69.5
35	0.0	0.0	0.0	0.0
36	0.0	0.0	50.0	32.0
37	0.0	0.0	147.0	92.0
38	0.0	0.0	93.5	88.0
39	25.0	30.0	0.0	0.0
40	0.0	0.0	0.0	0.0
41	0.0	0.0	225.0	123.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0

Contd.....

BUS NO	GENERATION		LOAD	POWER
44	180.0	55.0	0.0	0.0
45	0.0	0.0	0.0	0.0
46	0.0	0.0	78.0	38.6
47	0.0	0.0	234.0	145.0
48	340.0	250.0	0.0	0.0
49	0.0	0.0	295.0	183.0
50	0.0	0.0	40.0	24.6
51	0.0	0.0	227.0	142.0
52	0.0	0.0	0.0	0.0
53	0.0	0.0	0.0	0.0
54	0.0	0.0	108.0	68.0
55	0.0	0.0	25.5	48.0
56	0.0	0.0	0.0	0.0
57	0.0	0.0	55.6	35.6
58	0.0	0.0	42.0	27.0
59	0.0	0.0	57.0	27.4
60	0.0	0.0	0.0	0.0
61	0.0	0.0	0.0	0.0
62	0.0	0.0	40.0	27.0
63	0.0	0.0	33.2	20.6
64	300.0	75.0	0.0	0.0
65	0.0	0.0	0.0	0.0
66	96.0	25.0	0.0	0.0
67	0.0	0.0	14.0	6.5
68	90.0	25.0	0.0	0.0
69	0.0	0.0	0.0	0.0
70	0.0	0.0	11.4	7.0
71	0.0	0.0	0.0	0.0

LINE DATA

Line No	From Bus	To Bus	Line impedance		1/2 Y charge	Turns Ratio
1	9	8	0.0000	0.0570	0.0000	1.05
2	9	7	0.3200	0.0780	0.0090	1.00
3	9	5	0.0660	0.1600	0.0047	1.00
4	9	10	0.0520	0.1270	0.0140	1.00
5	10	11	0.0660	0.1610	0.0180	1.00
6	7	10	0.2700	0.0700	0.0070	1.00
7	12	11	0.0000	0.0530	0.0000	0.95
8	11	13	0.0600	0.1480	0.0300	1.00
9	14	13	0.0000	0.0800	0.0000	1.00
10	13	16	0.9700	0.2380	0.0270	1.00
11	17	15	0.0000	0.0920	0.0000	1.05
12	7	6	0.0000	0.2220	0.0000	1.05
13	7	4	0.0000	0.0800	0.0000	1.00
14	4	3	0.0000	0.0330	0.0000	1.05
15	4	5	0.0000	0.1600	0.0000	1.00
16	4	12	0.0160	0.0790	0.0710	1.00
17	12	14	0.0160	0.0790	0.0710	1.00
18	17	16	0.0000	0.0800	0.0000	0.95
19	2	4	0.0000	0.0620	0.0000	1.00
20	4	26	0.0190	0.0950	0.1930	0.00
21	2	1	0.0000	0.0340	0.0000	1.05
22	31	26	0.0340	0.1670	0.1500	1.00
23	26	25	0.0000	0.0800	0.0000	0.95
24	25	23	0.2400	0.5200	0.1300	1.00
25	22	23	0.0000	0.0800	0.0000	0.95
26	24	22	0.0000	0.0840	0.0000	0.95
27	22	17	0.0480	0.2500	0.0505	1.00
28	2	24	0.0100	0.1020	0.3353	1.00
29	23	21	0.0366	0.1412	0.0140	1.00
30	21	20	0.7200	0.1860	0.0050	1.00
31	20	19	0.1460	0.3740	0.0100	1.00

Contd.

Line No	From Bus	To Bus	Line impedance		1/2 Y charge	Turns Ratio
32	19	18	0.0590	0.1500	0.0040	1.00
33	18	16	0.0300	0.0755	0.0080	1.00
34	28	27	0.0000	0.0810	0.0000	1.05
35	30	29	0.0000	0.0610	0.0000	1.05
36	32	31	0.0000	0.0930	0.0000	0.95
37	31	30	0.0000	0.0800	0.0000	0.95
38	28	32	0.0051	0.0510	0.6706	1.00
39	3	33	0.0130	0.0640	0.0580	1.00
40	31	47	0.0110	0.0790	0.1770	1.00
41	2	32	0.0158	0.1570	0.5100	1.00
42	33	34	0.0000	0.0800	0.0000	0.95
43	35	33	0.0000	0.0840	0.0000	0.95
44	35	24	0.0062	0.0612	0.2120	1.00
45	34	36	0.0790	0.2010	0.0220	1.00
46	36	37	0.1690	0.4310	0.0110	1.00
47	37	38	0.0840	0.1880	0.0210	1.00
48	40	39	0.0000	0.3800	0.0000	1.05
49	40	38	0.0890	0.2170	0.0250	1.00
50	38	41	0.1090	0.1960	0.2200	1.00
51	41	51	0.2350	0.6000	0.0160	1.00
52	42	41	0.0000	0.0530	0.0000	0.95
53	45	42	0.0000	0.0840	0.0000	0.95
54	47	49	0.2100	0.1030	0.9200	1.00
55	49	48	0.0000	0.0460	0.0000	1.05
56	49	50	0.0170	0.0840	0.0760	1.00
57	49	42	0.0370	0.1950	0.0390	1.00
58	50	51	0.0000	0.0530	0.0000	0.95
59	52	50	0.0000	0.0840	0.0000	0.95
60	50	55	0.0290	0.1520	0.0300	1.00
61	50	53	0.0100	0.0520	0.0390	1.00
62	53	54	0.0000	0.0800	0.0000	0.95
63	57	54	0.0220	0.0540	0.0060	1.00

Contd.....

Line No	From Bus	To Bus	Line impedance		1/2 Y charge	Turns Ratio
64	55	56	0.0160	0.0850	0.0170	1.00
65	56	57	0.0000	0.0800	0.0000	1.00
66	57	59	0.0280	0.0720	0.0070	1.00
67	59	58	0.0480	0.1240	0.0120	1.00
68	60	59	0.0000	0.0800	0.0000	1.00
69	53	60	0.0360	0.1840	0.3700	1.00
70	45	44	0.0000	0.1200	0.0000	1.05
71	45	46	0.0370	0.0900	0.0100	1.00
72	46	41	0.0830	0.1540	0.0170	1.00
73	46	59	0.1070	0.1970	0.0210	1.00
74	60	61	0.0160	0.0830	0.0160	1.00
75	61	62	0.0000	0.0800	0.0000	0.95
76	58	62	0.0420	0.1080	0.0020	1.00
77	62	63	0.0350	0.0890	0.0090	1.00
78	69	68	0.0000	0.2220	0.0000	1.05
79	69	61	0.0230	0.1160	0.1040	1.00
80	67	66	0.0000	0.1880	0.0000	1.05
81	65	64	0.0000	0.0630	0.0000	1.05
82	65	56	0.0280	0.1440	0.0290	1.00
83	65	61	0.0230	0.1140	0.0240	1.00
84	65	67	0.0240	0.0600	0.0950	1.00
85	67	63	0.0390	0.0990	0.0100	1.00
86	61	42	0.0230	0.2293	0.0695	1.00
87	57	67	0.0550	0.2910	0.0070	1.00
88	45	70	0.1840	0.4680	0.0120	1.00
89	70	38	0.1650	0.4220	0.0110	1.00
90	33	71	0.0570	0.2960	0.0590	1.00
91	71	37	0.0000	0.0800	0.0000	0.95
92	45	41	0.1530	0.3880	0.1000	1.00
93	35	43	0.0131	0.1306	0.4293	1.00
94	52	52	0.0164	0.1632	0.5360	1.00

Shunt Load Data

S.No	Bus No	Shunt	Load
1	2	0.00	- 0.4275
2	13	0.00	0.1500
3	20	0.00	0.0800
4	24	0.00	- 0.2700
5	28	0.00	- 0.3375
6	31	0.00	0.2000
7	32	0.00	- 0.8700
8	34	0.00	0.2250
9	35	0.00	- 0.3220
10	36	0.00	0.1000
11	37	0.00	0.3500
12	38	0.00	0.2000
13	41	0.00	0.2000
14	43	0.00	- 0.2170
15	46	0.00	0.1000
16	47	0.00	0.3000
17	50	0.00	0.1000
18	51	0.00	0.1750
19	52	0.00	- 0.2700
20	54	0.00	0.1500
21	57	0.00	0.1000
22	59	0.00	0.0750
23	21	0.00	0.0500