

ELEKTRIJADA 2005

POWER SYSTEM ANALYSIS

1. Power system, shown on the Figure 1, supply consumption area with $\text{tg}\phi_p=1$. Voltage magnitude at bus 1 is constant $U_1=10.5$ kV.

- Find consumption area active and reactive power if voltage at bus 2 is $U_2=9.4$ kV.
- With shunt capacitor bank on the bus 2, voltage magnitude at bus 2 will increase from 9,4 kV to 10 kV. Find reactive power of that condensator battery.

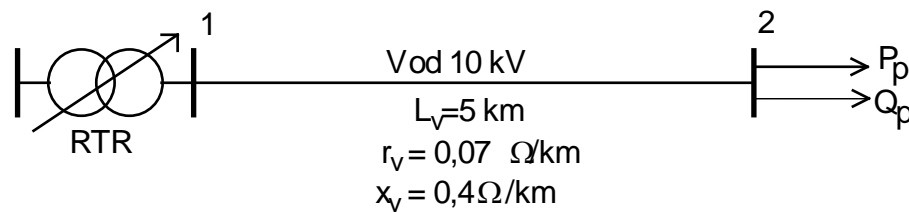


Figure 1.

2. Simply power system is shown on the Figure 2. In the case of single phase to ground fault at bus 3 find:

- Fault current at bus 3.
- Phase currents who flow through transformer T_3 .

Voltage at bus 3 before fault was $220/\sqrt{3}$ kV.

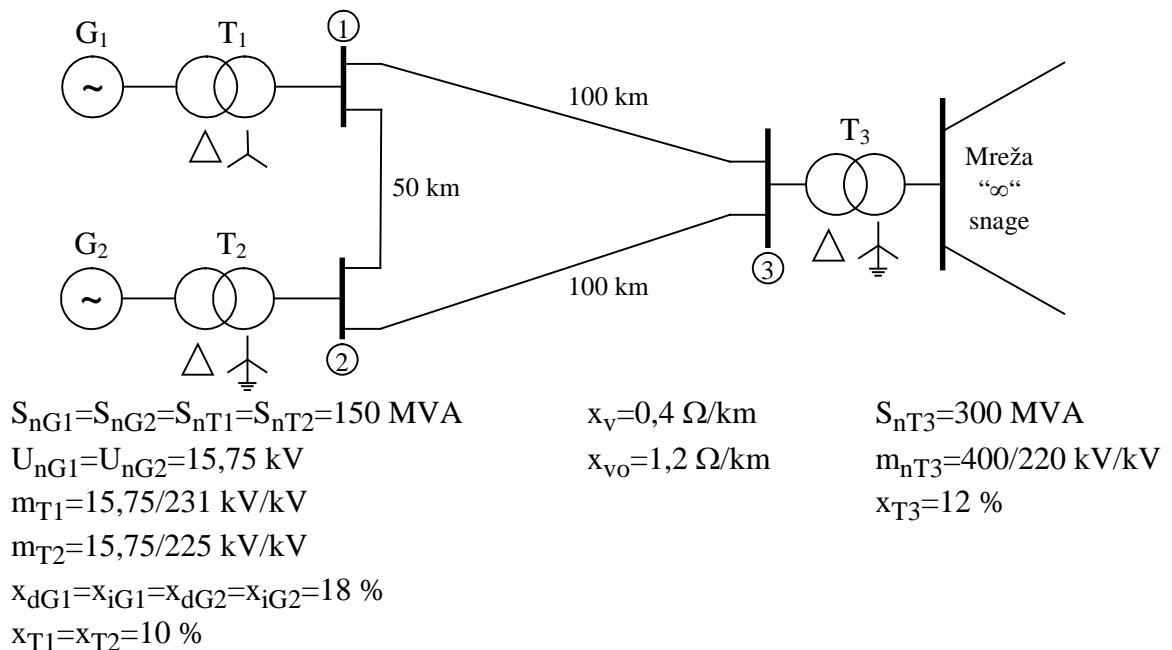


Figure 2.

3. For transformer, given at Figure 3, draw primar and secundar voltage vector diagrams, and find phase group.

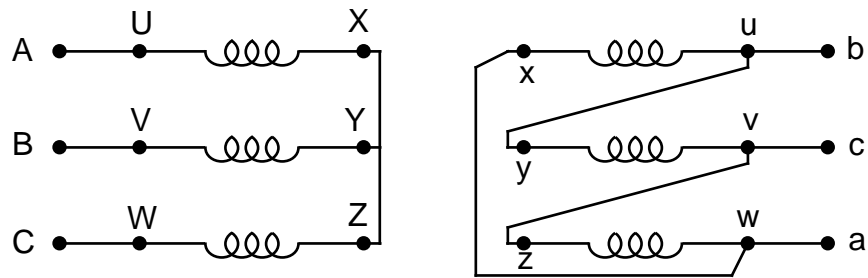


Figure 3.

4. Simply power system is given on the Figure 4. Find voltage magnitudes and angles after first iteration of the Newton-Raphson method for load flow calculation. Bus data are given in a table.

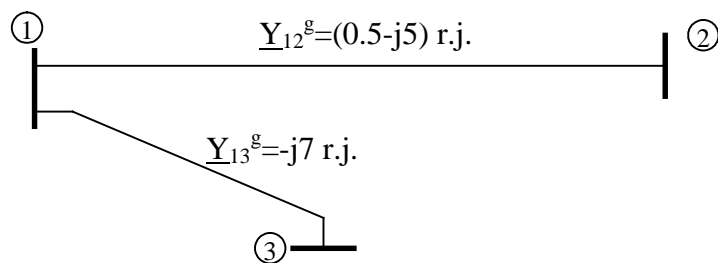


Figure 4.

bus	V (r.j.)	θ (rad)	P_G (r.j.)	P_P (r.j.)	Q_G (r.j.)	Q_P (r.j.)
1	1.05	0	/	0	/	0
2	/	/	0	1	0	0.5
3	1	/	0	1	0	/