

# TUGAS ANALISA ALIRAN DAYA

6.8. Figure 54 shows the one-line diagram of a simple three-bus power system with generation at buses 1 and 3. The voltage at bus 1 is  $V_1 = 1.025 \angle 0^\circ$  per unit. Voltage magnitude at bus 3 is fixed at 1.03 pu with a real power generation of 300 MW. A load consisting of 400 MW and 200 Mvar is taken from bus 2. Line impedances are marked in per unit on a 100 MVA base. For the purpose of hand calculations, line resistances and line charging susceptances are neglected.

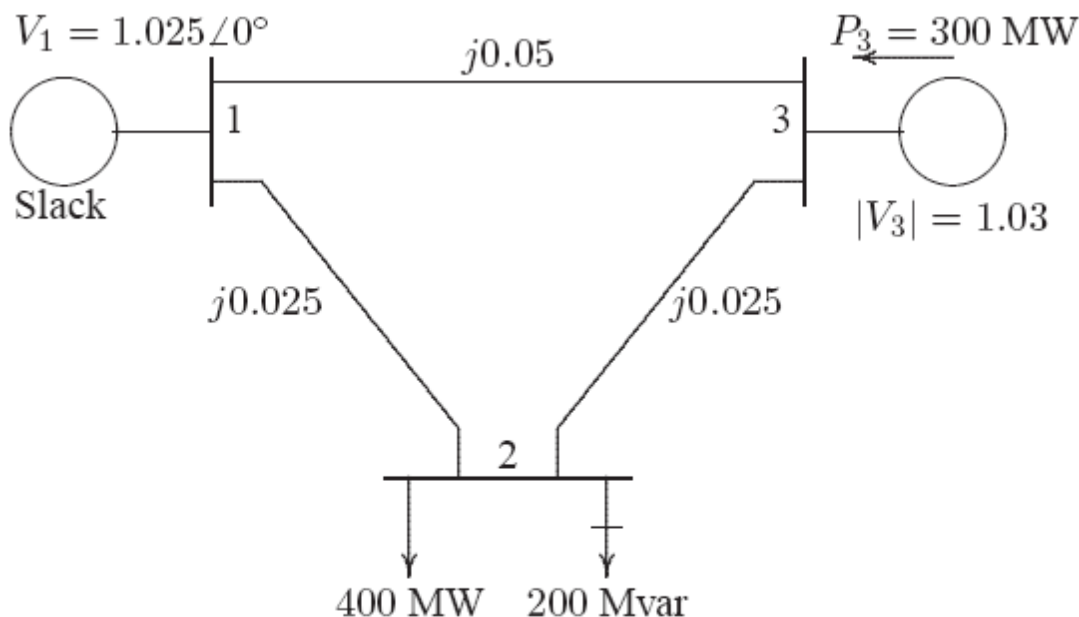
(a) Using Gauss-Seidel method and initial estimates of  $V_2^{(0)} = 1.0 + j0$  and  $V_3^{(0)} = 1.03 + j0$  and keeping  $|V_3| = 1.03$  pu, determine the phasor values of  $V_2$  and  $V_3$ . Perform two iterations.

(b) If after several iterations the bus voltages converge to

$$V_2 = 1.001243 \angle -2.1^\circ = 1.000571 - j0.0366898 \text{ pu}$$

$$V_3 = 1.03 \angle 1.36851^\circ = 1.029706 + j0.0246 \text{ pu}$$

determine the line flows and line losses and the slack bus real and reactive power. Construct a power flow diagram and show the direction of the line flows.



**FIGURE 54**

One-line diagram of Problem 6.8.