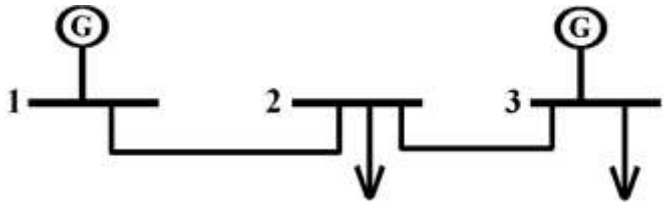
Example: Let's have the given 3-bus network (see figure below), where bus no. 1 is the slack bus (U_1 = 1.1 *pu*, θ_1 = 0), bus no. 2 is PQ bus and bus no. 3 is PU bus (U_3 = 1.05 *pu*, P_{G3} = 0.6 *pu*). Loads in buses no. 2 and no. 3 are as follows: P_{L2} = 1.0 *pu*, Q_{L2} = 0.4 *pu*, P_{L3} = 0.2 *pu*, Q_{L3} = 0.05 *pu*.



Values of series impedances in per units (base power is 100 MVA) are:
z_{12} = 0.03+j0.3 *pu*, z_{23} = 0.06+j0.2 *pu* Note: Shunt admittances are neglected.

Calculate the bus admittance matrix and find voltage conditions in buses no. 2 and no. 3, then calculate reactive power generation in PU bus and power conditions in the slack bus. Use the G-S method. Permitted tolerance is $1 \cdot 10^{-5}$, starting guess is nominal voltage magnitude and zero phase angles.

[Solution: $\underline{\bar{A}} = \begin{bmatrix} 0.33003 - 3.30033\,j & -0.33003 + 3.30033\,j & 0 \\ -0.33003 + 3.30033\,j & 1.70618 - 7.88749\,j & -1.37615 + 4.58716\,j \\ 0 & -1.37615 + 4.58716\,j & 1.37615 - 4.58716\,j \end{bmatrix} pu$

$U_2 = 0.99307\ pu, \theta_2 = -0.16167\,rad, \theta_3 = -0.09585\,rad.$

$Q_{G3} = 0.240175\ pu, P_{G1} = 0.623852\ pu, Q_{G1} = 0.377177\ pu.$]