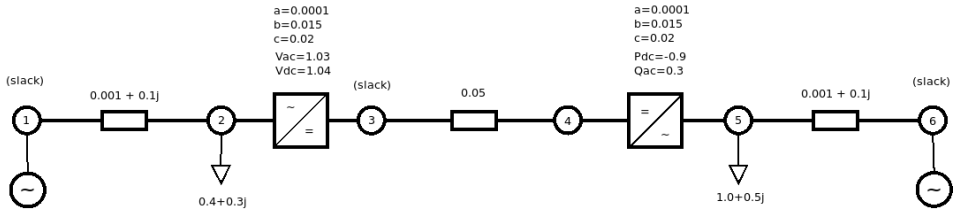

Figure 1:

$$\begin{bmatrix} \frac{\partial P}{\partial \theta} & \frac{\partial P}{\partial V_m} & \frac{\partial P}{\partial P_f} & \frac{\partial P}{\partial P_t} & \frac{\partial P}{\partial Q_t} \\ \frac{\partial Q}{\partial \theta} & \frac{\partial Q}{\partial V_m} & \frac{\partial Q}{\partial P_f} & \frac{\partial Q}{\partial P_t} & \frac{\partial Q}{\partial Q_t} \\ \frac{\partial P_{conv}}{\partial \theta} & \frac{\partial P_{conv}}{\partial V_m} & \frac{\partial P_{conv}}{\partial P_f} & \frac{\partial P_{conv}}{\partial P_t} & \frac{\partial P_{conv}}{\partial Q_t} \end{bmatrix} \times \begin{bmatrix} \Delta\theta & \forall\ i_{pv} \cup i_{pq} \\ \Delta V_m & \forall\ i_{pq} \\ \Delta P_f & \forall\ k_{conv} \\ \Delta P_t & \forall\ k_{conv} \\ \Delta Q_t & \forall\ k_{conv} \end{bmatrix} = \begin{bmatrix} \Delta P & \forall\ i_{pv} \cup i_{pq} \\ \Delta Q & \forall\ i_{pq} \\ \Delta P_{conv} & \forall\ k_{conv} \end{bmatrix} \tag{1}$$

Active power nodal balance:

$$\Delta P = P^{calc} - P^{esp} \tag{2}$$

Reactive power nodal balance:

$$\Delta Q = Q^{calc} - Q^{esp} \tag{3}$$

Converter power balance:

$$\Delta P_{conv} = P_f + P_t - P_{loss} \tag{4}$$

In this equation P_f and P_t are variables to be found iteratively.