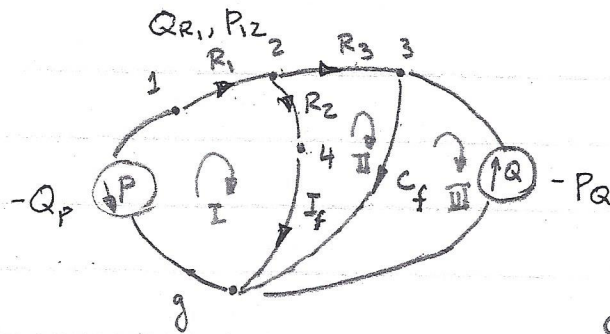




P & Q are inputs

nodes = 5

branches = 7

$b-s=5$ elemental eqs.

$$Q_{R_1} = \frac{P_{12}}{R_1}$$

$$Q_{R_3} = \frac{P_{23}}{R_3}$$

$$Q_{R_2} = \frac{P_{24}}{R_2}$$

$$P_{4g} = I_f \frac{dQ_f}{dt}$$

$$Q_{C_f} = C_f \frac{dP_{3g}}{dt}$$

Continuity

Node eqs

$$n-1 = 5-1 = 4$$

$$+ Q_P = Q_{R_1} \quad \text{or} \quad Q_{R_1} + (-Q_P) = 0$$

$$Q_{R_1} = Q_{R_3} + Q_{R_2}$$

$$Q_{R_2} = Q_{I_f}$$

$$Q_{R_3} + Q = Q_{C_f}$$

Compatibility

$$b-(n-1) = 7-5+1 = 3$$

$$-P + P_{12} + P_{24} + P_{4g} = 0$$

$$-P_{4g} - P_{24} + P_{23} + P_{3g} = 0$$

$$-P_{3g} + P_{3g} = 0 = -P_{3g} - (-P_Q)$$