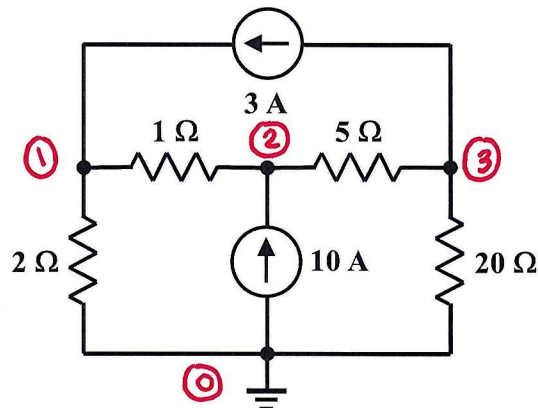


Homework Problem #018

Assign node labels and express the node equations in the matrix form discussed in class.



Do not attempt to solve the equations.

$$-3A + \frac{V_1 - V_2}{1\Omega} + \frac{V_1}{2\Omega} = 0 \quad (\text{KCL for node 1})$$

$$\frac{V_2 - V_1}{1\Omega} - 10A + \frac{V_2 - V_3}{5\Omega} = 0 \quad (\text{KCL for node 2})$$

$$3A + \frac{V_3 - V_2}{5\Omega} + \frac{V_3}{20\Omega} = 0 \quad (\text{KCL for node 3})$$

In matrix form:

$$\begin{bmatrix} \frac{1}{1} + \frac{1}{2} & -\frac{1}{1} & 0 \\ -\frac{1}{1} & \frac{1}{1} + \frac{1}{5} & -\frac{1}{5} \\ 0 & -\frac{1}{5} & \frac{1}{5} + \frac{1}{20} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} 3 \\ 10 \\ -3 \end{bmatrix}$$