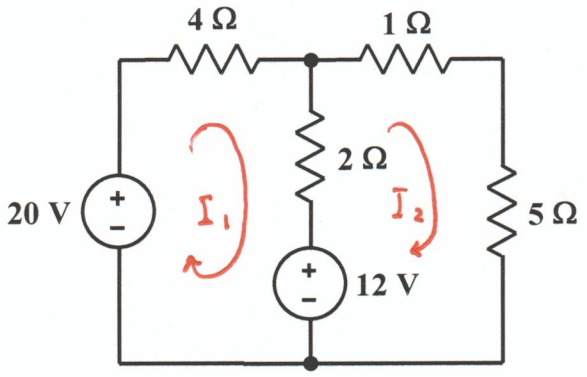
EE 2240

Problem #03



a. How many equations are necessary to analyze this circuit by the mesh analysis method?

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Use the method discussed in class to:

b. Develop the mesh equations describing the circuit.

$$-20 + 4I_1 + 2(I_1 - I_2) + 12 = 0$$

$$-12 + 2(I_2 - I_1) + 1I_2 + 5I_2 = 0$$

c. Write the mesh equations in the matrix form discussed in class.

$$\begin{bmatrix} 6 & -2 \\ -2 & 8 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} 8 \\ 12 \end{bmatrix}$$

d. Solve the mesh equations.

$I_1 = 2A$ $\qquad$ $I_2 = 2A$

e. Use the results of your mesh analysis to determine the amount of power absorbed by the 5Ω resistor.

$$P = (5\Omega)(I_2)^2 = 20\,W$$