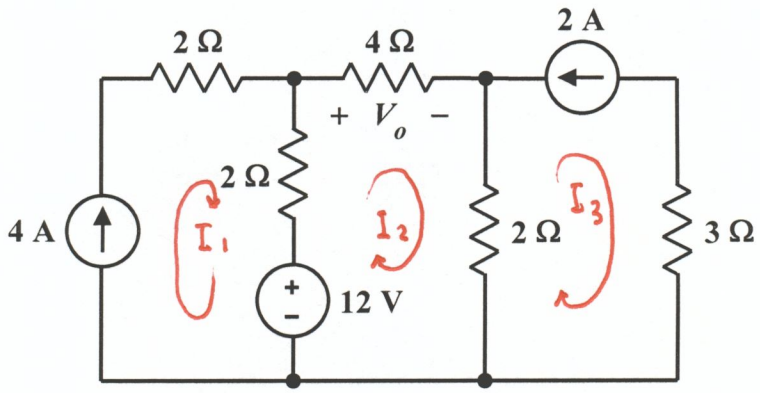
EE 2240

Problem #10



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

3

Use the method discussed in class to:

b. Develop the mesh equations describing the circuit.

$I_1 = 4A$

$I_3 = -2A$

$-12 + 2(I_2 - I_1) + 4I_2 + 2(I_2 - I_3) = 0$

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

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ -2 & 8 & -2 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \end{bmatrix} = \begin{bmatrix} 4 \\ -2 \\ 12 \end{bmatrix}$$

d. Solve the equations.

$I_1 = 4A$ $\quad I_2 = 2A$ $\quad I_3 = -2A$

e. Use the results of your mesh analysis to determine the value of V_o.

$V_o = 4\Omega(I_2) = 8V$