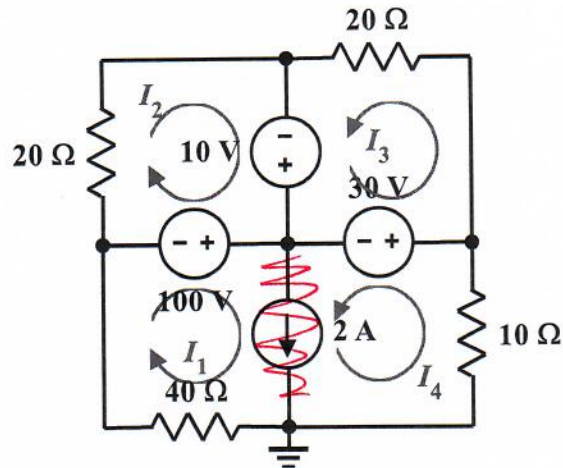


EE/EET 2240  
**Homework Problem #016**

Express mesh equations in the matrix form discussed in class. Note that mesh currents are already defined, and they are *not* all in the same direction.



$$I_4 + I_1 = 2 \quad (\text{constraint})$$

$$20I_2 - 10 + 100 = 0 \quad (\text{KVL for mesh 1})$$

$$20I_3 + 30 + 10 = 0 \quad (\text{KVL for mesh 3})$$

$$-100 - 30 + 10I_4 + 40I_1 = 0 \quad (\text{KVL for the supermesh})$$

In matrix form:

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 20 & 0 & 0 \\ 0 & 0 & 20 & 0 \\ 40 & 0 & 0 & 10 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{bmatrix} = \begin{bmatrix} 2 \\ -90 \\ -40 \\ 130 \end{bmatrix}$$