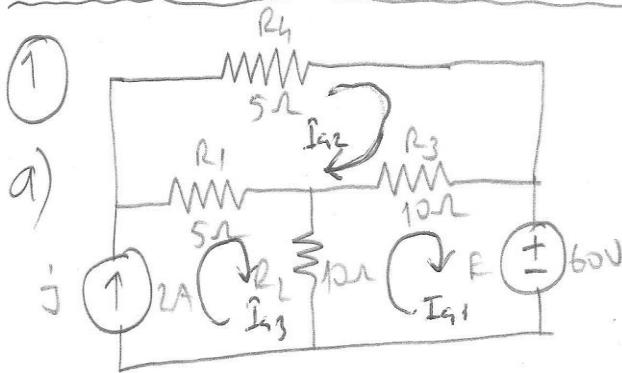




$$I_{G1} = ?$$

$$I_{G2} = ?$$

$$I_{G3} = J = 2A$$



$$\begin{bmatrix} R_2 + R_3 & -R_3 \\ -R_3 & R_1 + R_3 + R_4 \end{bmatrix} \cdot \begin{bmatrix} I_{G1} \\ I_{G2} \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} E + \begin{bmatrix} -R_2 \\ -R_1 \end{bmatrix} \cdot J = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \quad (10)$$

$$b) \begin{bmatrix} 10 + 10 & -10 \\ -10 & 5 + 10 + 5 \end{bmatrix} \cdot \begin{bmatrix} I_{G1} \\ I_{G2} \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} 60 + \begin{bmatrix} -10 \\ -5 \end{bmatrix} \cdot 2 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 20 & -10 \\ -10 & 20 \end{bmatrix} \cdot \begin{bmatrix} I_{G1} \\ I_{G2} \end{bmatrix} = \begin{bmatrix} -40 \\ 10 \end{bmatrix} \quad (5)$$

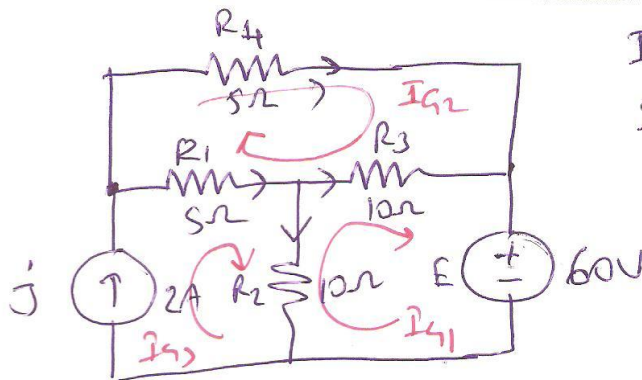
$$I_{G1} = \frac{\begin{vmatrix} -40 & -10 \\ 10 & 20 \end{vmatrix}}{\begin{vmatrix} 20 & -10 \\ -10 & 20 \end{vmatrix}} = \frac{-40 \cdot 20 - 10(-10)}{20 \cdot 20 - (-10)(-10)} = \frac{-700}{300} \Rightarrow I_{G1} = -\frac{7}{3} = -2,333A \quad (5)$$

$$I_{G2} = \frac{\begin{vmatrix} 20 & -40 \\ -10 & 10 \end{vmatrix}}{\begin{vmatrix} 20 & -10 \\ -10 & 20 \end{vmatrix}} = \frac{20 \cdot 10 - (-10)(-40)}{300} = \frac{-200}{300} \Rightarrow I_{G2} = -\frac{2}{3} = -0,666A \quad (5)$$

$$I_{R3} = I_{G2} - I_{G1} = -\frac{2}{3} - (-\frac{7}{3}) = \frac{5}{3} \Rightarrow I_{R3} = \frac{5}{3} = 1,666A \quad (5)$$

$$P_{R3} = R_3 \cdot I_{R3}^2 = 10 \cdot 1,666^2 \Rightarrow P_{R3} = 27,75W \quad (5)$$

Denklemler Adm-Adm Elde Edilmesi



$$I_{43} = \hat{J} = 2A$$

$$I_{41} = ?, I_{42} = ?$$

$$I_{41} = I_{43} - I_{42} = \hat{J} - I_{42}$$

$$I_{42} = \hat{J} - I_{41}$$

$$I_{43} = (I_{41} - I_{42})$$

$$I_{44} = I_{42}$$

I_{41} seçersek 1. denklemler

$$-V_{R2} + V_{R3} + E = 0$$

$$-R_2 I_{42} + R_3 I_{43} + E = 0$$

$$-R_2 (\hat{J} - I_{41}) + R_3 (I_{41} - I_{42}) + E = 0$$

$$(R_2 + R_3) \cdot I_{41} - R_3 \cdot I_{42} + E - R_2 \cdot \hat{J} = 0$$

(1. denklemler)

I_{42} seçersek 2. denklemler

$$-V_{R3} - V_{R1} + V_{R4} = 0$$

$$-R_3 \cdot I_{43} - R_1 \cdot I_{42} + R_4 \cdot I_{41} = 0$$

$$-R_3 (I_{41} - I_{42}) - R_1 (\hat{J} - I_{42}) + R_4 \cdot I_{42} = 0$$

$$-R_3 \cdot I_{41} + (R_1 + R_3 + R_4) I_{42} - R_1 \cdot \hat{J} = 0$$

(2. denklemler)

$$(R_2 + R_3) I_{41} - R_3 \cdot I_{42} + E - R_2 \cdot \hat{J} = 0$$

$$-R_3 \cdot I_{41} + (R_1 + R_3 + R_4) I_{42} - R_1 \cdot \hat{J} = 0$$

$$\begin{bmatrix} (R_2 + R_3) & -R_3 \\ -R_3 & (R_1 + R_3 + R_4) \end{bmatrix} \begin{bmatrix} I_{41} \\ I_{42} \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} \cdot E + \begin{bmatrix} -R_1 \\ -R_4 \end{bmatrix} \hat{J} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$