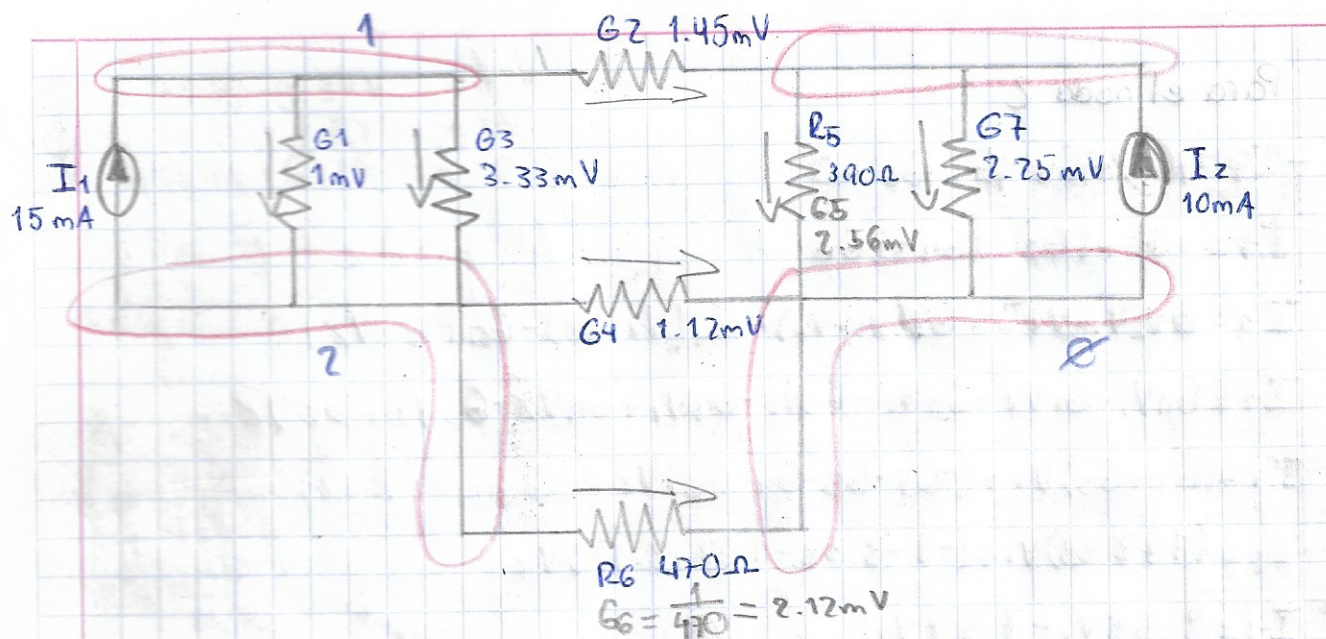


Tarea 4.

3



Para el nodo 1

$$I_1 - i_{G1} - i_{G3} - i_{G2} = 0$$

$$I_1 = i_{G1} + i_{G3} + i_{G2}$$

$$I_1 + G_1[V_1 - V_2] + G_3[V_1 - V_2] + G_2[V_1 - V_3]$$

$$I_1 = G_1 V_1 - G_1 V_2 + G_3 V_1 - G_3 V_2 + G_2 V_1 - G_2 V_3$$

$$I_1 = (G_1 + G_2 + G_3)V_1 + (-G_1 - G_3)V_2 - G_2 V_3$$

$$I_1 = (1 + 1.45 + 3.33)V_1 + (-1 - 3.33)V_2 - 1.45V_3$$

$$I_1 = 5.78V_1 - 4.33V_2 - 1.45V_3 \quad \text{①}$$

Para el nodo 2

$$-I_1 + i61 + i63 - i64 - i66 = 0$$

$$I_1 = i61 + i63 - i64 - i66$$

$$I_1 = G_1[V_1 - V_2] + G_3(V_1 - V_2) - G_4(V_2 - V_0) - G_6(V_2 - V_0)$$

$$I_1 = G_1V_1 - G_1V_2 + G_3V_1 - G_3V_2 - G_4V_2 + G_4V_0 - G_6V_2 + G_6V_0$$

$$I_1 = (G_1 + G_3)V_1 + (-G_1 - G_3 - G_4 - G_6)V_2$$

$$I_1 = (1 + 3.33)V_1 + (-1 - 3.33 - 1.12 - 2.12)V_2$$

$$I_1 = 4.33V_1 - 7.57V_2 \quad (2)$$

Para el nodo 3

$$I_2 - i67 - i65 + i62 = 0$$

$$I_2 = i67 + i65 - i62$$

$$I_2 = -G_2[V_1 - V_3] + G_5[V_3 - V_0] + G_7[V_3 - V_0]$$

$$I_2 = -G_2V_1 + G_2V_3 + G_5V_3 - G_5V_0 + G_7V_3 - G_7V_0$$

$$I_2 = -G_2V_1 + (G_2 + G_5 + G_7)V_3$$

$$I_2 = -1.45V_1 + (1.45 + 2.56 + 2.25)V_3$$

$$I_2 = -1.45V_1 + 6.26V_3 \quad (3)$$

$$\textcircled{1} \quad 5.78V_1 - 4.33V_2 - 1.45V_3 = 15$$

$$\textcircled{2} \quad 4.33V_1 - 7.57V_2 = 15$$

$$\textcircled{3} \quad -1.45V_1 + 6.26V_3 = 10$$

$$\begin{pmatrix} 5.78 & -4.33 & -1.45 & 15 \\ 4.33 & -7.57 & 0 & 15 \\ -1.45 & 0 & 6.26 & 10 \end{pmatrix} \rightarrow \begin{pmatrix} \frac{289}{50} & -\frac{433}{100} & -\frac{29}{20} & 15 \\ \frac{433}{100} & -\frac{757}{100} & 0 & 15 \\ -\frac{29}{20} & 0 & 6.26 & 10 \end{pmatrix} \left(\frac{50}{289} \right)$$

$$\begin{matrix} R_2 - \frac{433}{100} R_1 \\ R_3 + \frac{29}{20} R_1 \end{matrix} \begin{pmatrix} 1 & -\frac{433}{100} & -\frac{29}{20} & \frac{750}{289} \\ 0 & -\frac{250057}{57800} & \frac{12557}{11560} & \frac{2175}{578} \\ 0 & -\frac{12557}{11560} & \frac{340803}{57800} & \frac{7955}{578} \end{pmatrix} \rightarrow \begin{pmatrix} 1 & -\frac{433}{100} & -\frac{29}{20} & \frac{750}{289} \\ 0 & 1 & -\frac{67785}{250057} & -\frac{217506}{250057} \\ 0 & 0 & 1 & \frac{140619737}{140619737} \end{pmatrix}$$

$$\begin{matrix} R_2 + \frac{67785}{250057} R_3 \\ R_1 + \frac{145}{578} R_1 \end{matrix} \begin{pmatrix} 1 & -\frac{433}{100} & -\frac{145}{578} & \frac{750}{289} \\ 0 & 1 & 0 & -0.29 \\ 0 & 0 & 1 & 2.27 \end{pmatrix} \begin{matrix} R_1 + \frac{145}{578} R_1 \\ R_1 + \frac{145}{578} R_1 \end{matrix} \begin{pmatrix} 1 & -\frac{433}{100} & 0 & 3.16 \\ 0 & 1 & 0 & -0.29 \\ 0 & 0 & 1 & 2.27 \end{pmatrix}$$

$$R_1 + \frac{433}{100} R_2 \begin{pmatrix} 1 & 0 & 0 & 2.94 \\ 0 & 1 & 0 & -0.29 \\ 0 & 0 & 1 & 2.27 \end{pmatrix}$$

$$\begin{aligned} V_1 &= 2.94 \text{ mV} \\ V_2 &= -0.29 \text{ mV} \\ V_3 &= 2.27 \text{ mV} \end{aligned}$$