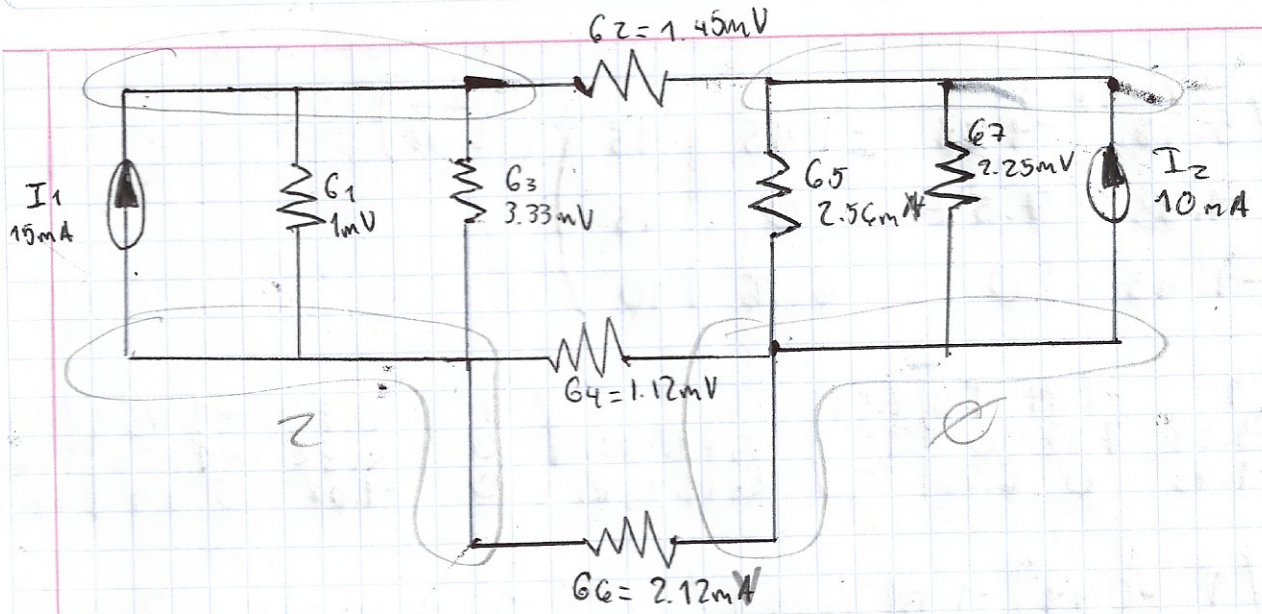
Ejercicio: Afc 26



Admitancias propias

$Y_{11} = 5.78 mU$, $Y_{22} = 7.57 mU$, $Y_{33} = 6.26 mU$

Admitancias mutuas

$Y_{12} = 4.33 mU$, $Y_{13} = 1.45 mU$, $Y_{23} = 0 mU$

Nodo 1

$Y_{11} V_1 - Y_{12} V_2 - Y_{13} V_3 = 15 mA$

Nodo 2

$-Y_{21} V_1 + Y_{22} V_2 - Y_{23} V_3 = 15 mA$

Nodo 3

$-Y_{31} V_1 - Y_{32} V_2 + Y_{33} V_3 = 10 mA$ ∴

$5.78 V_1 - 4.33 V_2 - 1.45 V_3 = 15 mA$

$-4.33 V_1 + 7.57 V_2 = 15 mA$

$-1.45 V_1 + 6.26 V_3 = 10 mA$

$$\left(\begin{array}{ccc|c} 5.78 & -4.33 & -1.45 & 15 \\ -4.33 & 7.57 & 0 & 15 \\ -1.45 & 0 & 6.26 & 10 \end{array}\right)\left(\frac{1}{5.78}\right)$$

$$\left(\begin{array}{ccc|c} 1 & -0.74 & -1.45 & 2.59 \\ -4.33 & 7.37 & 0 & 15 \\ -1.45 & 0 & 6.26 & 10 \end{array}\right) \begin{array}{l} R_2+4.33R_1 \\ R_3+1.45R_1 \end{array} \left(\begin{array}{ccc|c} 1 & -0.74 & -1.45 & 2.59 \\ 0 & 4.32 & -1.08 & 26.23 \\ 0 & -1.08 & 5.89 & 13.76 \end{array}\right)$$

$$R_2\left(\frac{1}{4.32}\right)\left(\begin{array}{ccc|c} 1 & -0.74 & -1.45 & 2.59 \\ 0 & 1 & -0.25 & 6.06 \\ 0 & 0 & 5.62 & 20.35 \end{array}\right)\left(\frac{1}{5.62}\right) \left(\begin{array}{ccc|c} 1 & -0.74 & -1.45 & 2.59 \\ 0 & 1 & -0.25 & 6.06 \\ 0 & 0 & 1 & 2.27 \end{array}\right)$$

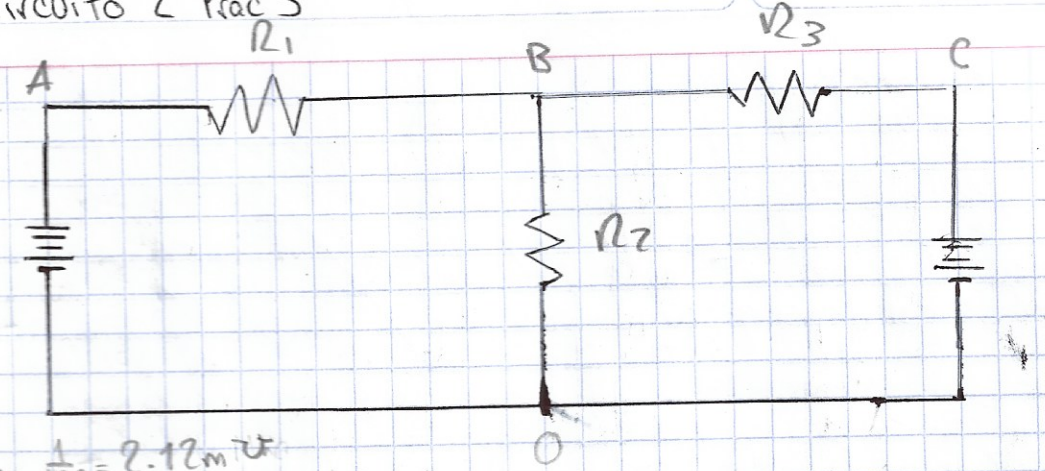
$$\begin{array}{l} R_1+1.45R_3 \\ R_2+0.25R_3 \end{array}\left(\begin{array}{ccc|c} 1 & -0.74 & 0 & 3.50 \\ 0 & 1 & 0 & -0.29 \\ 0 & 0 & 1 & 2.27 \end{array}\right) \quad R_1+0.74R_2 \left(\begin{array}{ccc|c} 1 & 0 & 0 & 2.94 \\ 0 & 1 & 0 & -0.29 \\ 0 & 0 & 1 & 2.27 \end{array}\right)$$

$V_1 = 2.94\,V$

$V_2 = -0.29\,V$

$V_3 = 2.27\,V$

Circuito 2 Prac 3



$G_1 = \frac{1}{470} = 2.12 m\mho$

$G_2 = \frac{1}{330} = 3.03 m\mho$

$G_3 = \frac{1}{560} = 1.78 m\mho$

Admitancias propias

$Y_{11} = 2.12 m\mho$, $Y_{22} = 6.93 m\mho$, $Y_{33} = 1.78 m\mho$

Admitancia mutua

$Y_{12} = 2.12 m\mho$, $Y_{13} = 0$, $Y_{23} = 1.78 m\mho$

Nodo A

$Y_{11} V_1 - Y_{12} V_2 - Y_{13} V_3 = I_{fvs1}$

Nodo B

$-Y_{21} V_1 + Y_{22} V_2 - Y_{23} V_3 = 0$

Nodo C

$-Y_{31} V_1 - Y_{32} V_2 + Y_{33} V_3 = I_{fvs2}$

$\therefore$

$2.12 V_1 - 2.12 V_2 - 0 V_3 = I_{fvs1}$

$-2.12 V_1 + 6.93 V_2 - 1.78 V_3 = 0$

$0 V_1 - 1.78 V_2 + 1.78 V_3 = I_{fvs2}$

① $2.12(9) - 2.12V_2 = I_{fvs1} \rightarrow 19.08 - 2.12V_2 = I_{fvs1}$

② $-2.12(9) + 6.93V_2 - 1.78(5) = 0 \rightarrow -27.98 + 6.93V_2 = 0$

③ $-1.78V_2 + 1.78(5) = I_{fvs2} \rightarrow -1.78V_2 + 8.9 = I_{fvs2}$

↓

$6.93V_2 = 27.98$

$V_2 = \frac{27.98}{6.93} \rightarrow V_2 = 4.03$

I_{fvs1}

$19.08 - 2.12(4.03) = I_{fvs1}$

$19.08 - 8.54 = I_{fvs1} \rightarrow \underline{I_{fvs1} = 10.54\,mA}$

I_{fvs2}

$-1.78(4.03) + 8.9 = I_{fvs2}$

$-7.17 + 8.9 = I_{fvs2} \rightarrow \underline{I_{fvs2} = 1.72\,mA}$