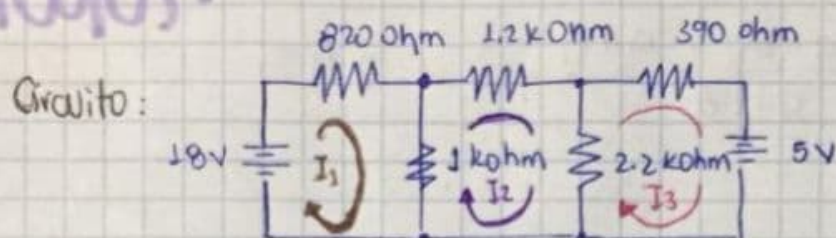


# Universidad de las Fuerzas Armadas

## "ESPE"

### • Cálculos:



Circuito dividido en 3 mallas  $I_1, I_2, I_3$

#### \* Cálculos de Mallas

$I_1 \rightarrow$  Malla 1

$$\sum V = 0$$

$$18 = V_1 + V_2$$

$$18 = 0,82 I_1 + 1(I_1 - I_2)$$

$$18 = 1,82 I_1 - I_2$$

Ec. 1

$I_2$

Malla 2:

$$\sum V = 0$$

$$V_2 + V_3 + V_4 = 0$$

$$1(I_2 - I_1) + 1,2 I_2 + 2,2(I_2 - I_3) = 0$$

$$4,4 I_2 - I_1 - 2,2 I_3 = 0$$

Ec. 2

$$\begin{bmatrix} 1,82 & -1 & 0 & | & 18 \\ -1 & 4,4 & -2,2 & | & 0 \\ 0 & -2,2 & 2,59 & | & -5 \end{bmatrix}$$

$$1,82 I_1 + I_2$$

$$\begin{bmatrix} 1,82 & -1 & 0 & | & 18 \\ 0 & 3,008 & -4,004 & | & 18 \\ 0 & -2,2 & 2,59 & | & -5 \end{bmatrix}$$

$$3,504(I_3) + 1,1(I_2)$$

$$4,67096 I_3 = 2,28$$

$$I_3 = 0,488 \text{ mA}$$

$$3,008 I_2 - 4,004(0,488) = 18$$

$$I_2 = 2,847 \text{ mA}$$

$$1,82 I_1 - 2,85 = 18$$

$$I_1 = 11,456 \text{ mA}$$

#### \* Conversiones

$$820 \text{ ohm} \left| \frac{1 \text{ k}\Omega}{1000} \right|$$

$$= 0,82 \text{ k}\Omega$$

$$390 \Omega \left| \frac{1 \text{ k}\Omega}{1000} \right|$$

$$0,39 \Omega$$

$I_3$

Malla 3:

$$V_4 + V_5 = -5$$

$$2,2(I_3 - I_2) + 0,39 I_3 = -5$$

$$2,59 I_3 - 2,2 I_2 = -5$$

Ec. 3

$$1,82 I_1 - I_2 = 18$$

$$-I_1 + 4,4 I_2 - 2,2 I_3 = 0$$

$$-2,2 I_2 + 2,59 I_3 = -5$$

$$\begin{bmatrix} 1,82 & -1 & 0 & | & 18 \\ 0 & 3,008 & -4,004 & | & 18 \\ 0 & 0 & 4,67096 & | & 2,28 \end{bmatrix}$$

\* Cálculo de Eror.

$$eI\% = \frac{|\text{valor teórico} - \text{valor calculado}|}{\text{valor teórico}} \cdot 100$$

$$eI_1\% = \frac{|11,456 - 11,5|}{11,456} \cdot 100 = 0,38\%$$

$$eI_2\% = \frac{|12,847 - 12,851|}{12,847} \cdot 100 = 0,10\%$$

$$eI_3\% = \frac{|0,488 - 0,491|}{0,488} \cdot 100 = 0,41\%$$