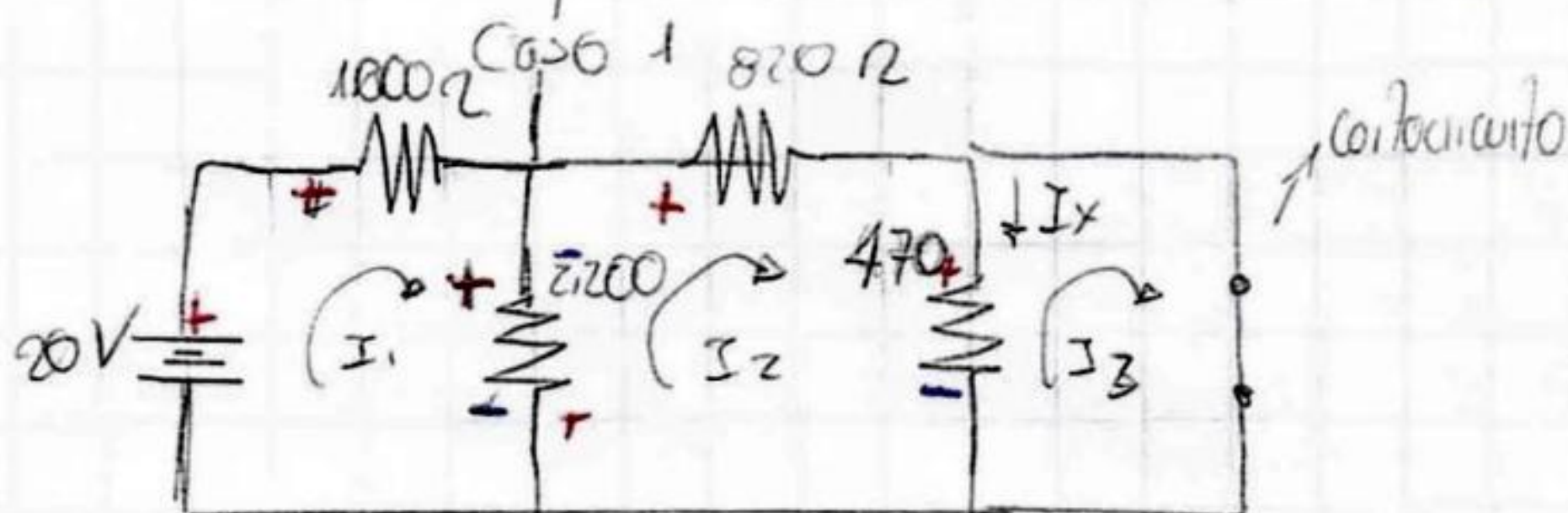


Superposición



Malla ①

$$20 - 1000(I_1) - 2200(I_1 - I_2) = 0$$

$$-3200I_1 + 2200I_2 = -20 //$$

Malla ②

$$-820(I_2) - 470(I_2 - I_3) - 2200(I_2 - I_1) = 0$$

$$2200I_1 - 3490I_2 + 470I_3 = 0 //$$

Malla ③

$$-470I_3 + 470I_2 = 0$$

Ecuación de Mallas

$$\begin{cases} -3200I_1 + 2200I_2 = -20 \\ 2200I_1 - 3490I_2 + 470I_3 = 0 \\ +470I_2 - 470I_3 = 0 \end{cases} \Rightarrow \begin{aligned} I_1 &= 0.0125 \\ I_2 &= 0.0091210 \\ I_3 &= 0.0091210 \end{aligned}$$

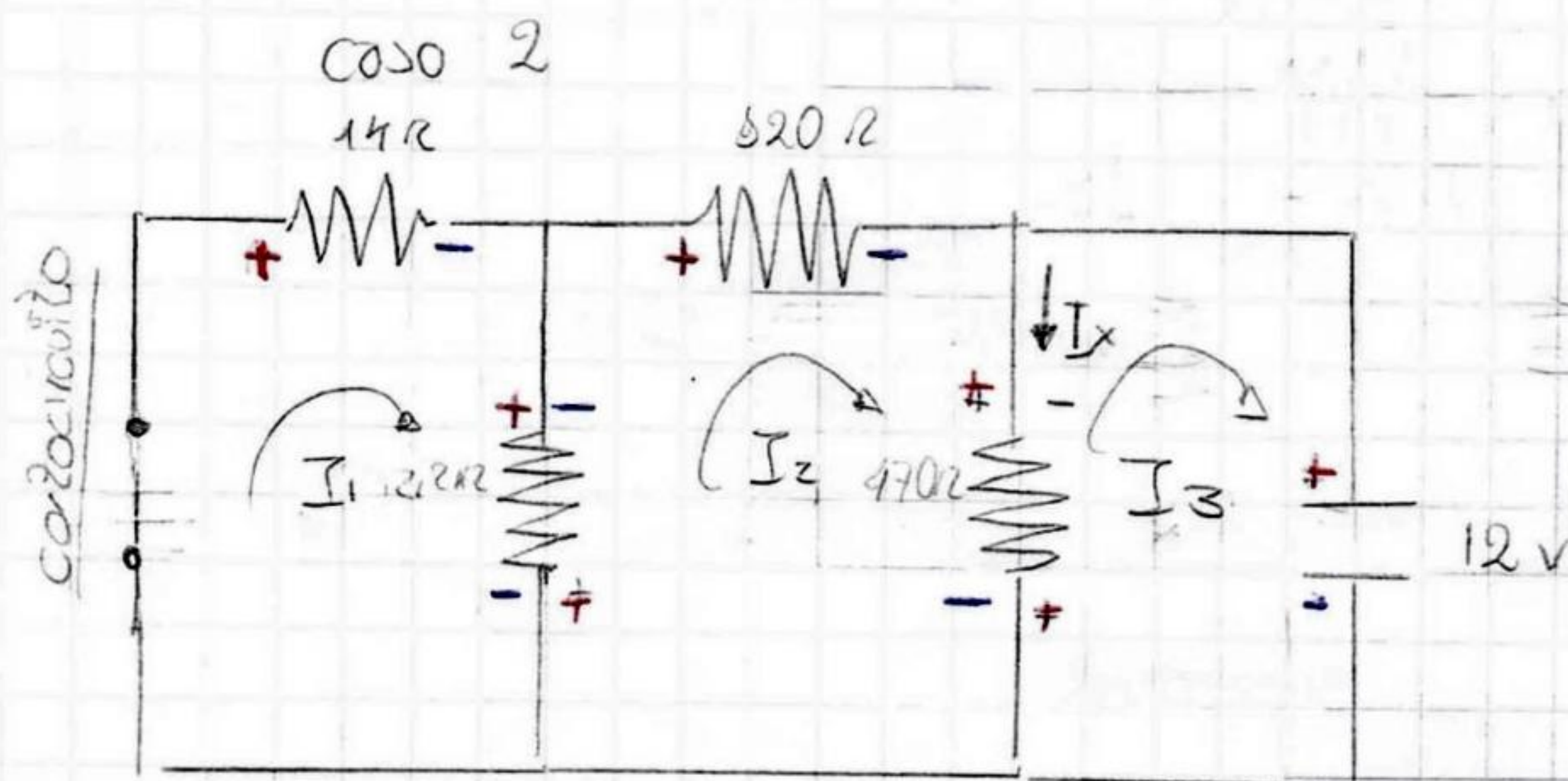
$$V_a = I_2 \cdot R$$

$$V_a = 0.0091210 \cdot 820$$

$$I_{x0} = I_2 - I_3 = 0.0091210 - 0.0091210$$

$$I_{x1} = 0 //$$

① $V_a = 7.47922 V //$



Malla 1

$$\begin{aligned} -1000I_1 - 2200(I_1 - I_2) &= 0 \\ -3200I_1 + 2200I_2 &= 0 \quad (1) \end{aligned}$$

Malla 2

$$\begin{aligned} -820I_2 - 470(I_2 - I_3) - 2200(I_2 - I_1) &= 0 \\ 2200I_2 - 3490I_2 + 470I_3 &= 0 \end{aligned}$$

Malla 3

$$-12 + 470I_2 - 470I_3 = 0$$

Ecuación Mallas.

$$\begin{cases} -3200I_1 + 2200I_2 = 0 & I_1 = -0.0054726 \\ 2200I_2 - 3490I_2 + 470I_3 = 0 & I_2 = -0.0079602 \\ 470I_2 - 470I_3 = 12 & I_3 = -0.03349 \end{cases}$$

$$V_a = I_2 \cdot R$$

$$V_a = -0.0079602 \cdot 820$$

$$V_a = -6.52736 \text{ V} //$$

$$V_{TR} = V_{A1} + V_{A2}$$

$$V_{TR} = 7.47922 - 6.52736$$

$$V_{TR} = 951.86 \text{ mV} \sim 0.95186 \text{ V} //$$

$$I_x = I_2 - I_3$$

$$I_x = -0.0079602 - (-0.03349)$$

$$I_{x\text{②}} = 0.0255298 \text{ A} \sim 25.53 \text{ mA} // = I_{x\text{TOTAL}} //$$