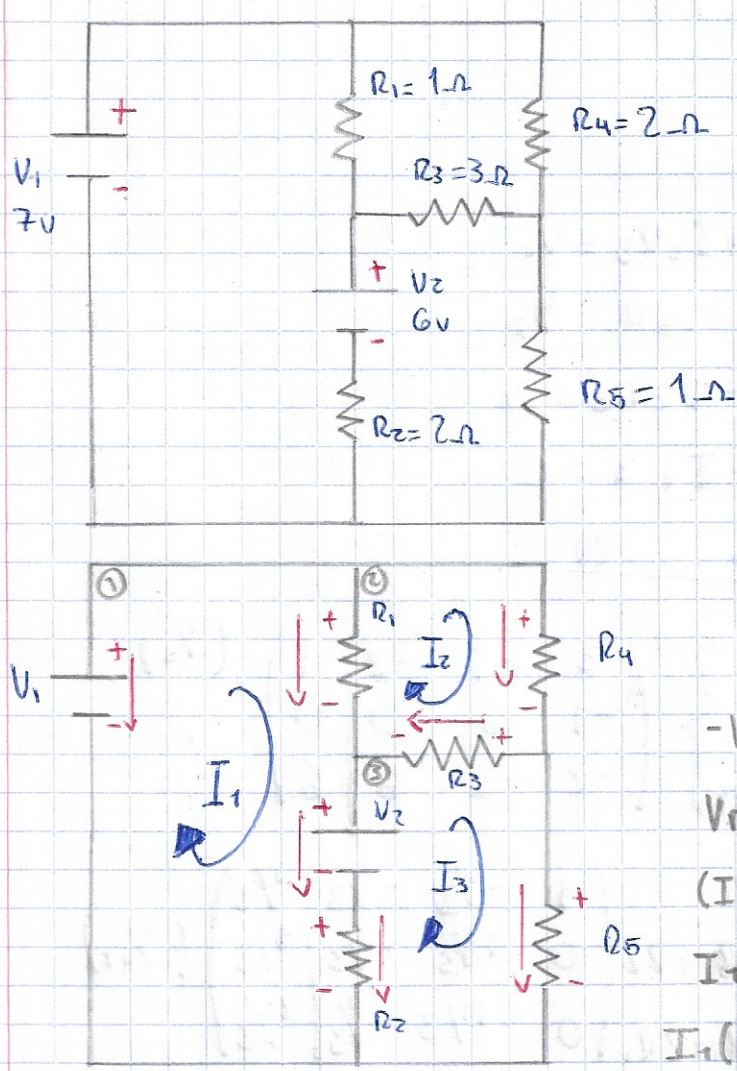
Tarea 3. Problema de Ley de Kirchoff de Voltaje

Empleando la L, K, V calcule la corriente que circule en cada una de las mallas



Malla ①

$V_1 \; V_2 \; V_{R1} \; V_{R2} = \emptyset$

$-V_1 + V_2 + V_{R1} + V_{R2} = \emptyset$

$V_{R1} + V_{R2} = V_1 - V_2$

$(I_1 - I_2)R_1 + (I_1 - I_3)R_2 = V_1 - V_2$

$I_1 R_1 - I_2 R_1 + I_1 R_2 - I_3 R_2 = V_1 - V_2$

$I_1(R_1 + R_2) - I_2 R_1 - I_3 R_2 = V_1 - V_2$

$I_1(1 + 2) - I_2 1 - I_3 2 = 7v - 6v$

$3I_1 - I_2 - 2I_3 = 1$ ①

Malla ②

$-V_{R1} + V_{R3} + V_{R4} = \emptyset$

$-(I_1 - I_2)R_1 + I_2 R_3 + I_2 R_4 = \emptyset$

$-I_1 R_1 + I_2 R_1 + I_2 R_3 + I_2 R_4 = \emptyset$

$I_2(R_1 + R_3 + R_4) - I_1 R_1 = \emptyset$

$I_2(1 + 3 + 2) - I_1 1 = \emptyset$

$6I_2 - I_1 = \emptyset$ ②

Malla ③

$-V_2 - VR_2 - VR_3 + VR_5 = \emptyset$

$-VR_2 - VR_3 + VR_5 = V_2$

$-(I_1 - I_3)R_2 - (I_2 - I_3)R_3 + I_3 R_5 = V_2$

$-I_1 R_2 + I_3 R_2 - I_2 R_3 + I_3 R_3 + I_3 R_5 = V_2$

$I_3(R_2 + R_3 + R_5) - I_1 R_2 - I_2 R_3 = V_2$

$I_3(2 + 3 + 1) - I_1 2 - I_2 3 = 6$

$6I_3 - 2I_1 - 3I_2 = 6$ ③

① $3I_1 - I_2 - 2I_3 = 1$

② $-I_1 + 6I_2 = \emptyset$

③ $-2I_1 - 3I_2 + 6I_3 = 6$

$$\left(\begin{array}{ccc|c} 3 & -1 & -2 & 1 \\ -1 & 6 & 0 & 0 \\ -2 & -3 & 6 & 6 \end{array}\right) (1/3)$$

$$\left(\begin{array}{ccc|c} 1 & -1/3 & -2/3 & 1/3 \\ -1 & 6 & 0 & 0 \\ -2 & -3 & 6 & 6 \end{array}\right) \longrightarrow \begin{array}{l} R_1 + R_2 \\ R_2 + 2R_1 \end{array} \left(\begin{array}{ccc|c} 1 & -1/3 & -2/3 & 1/3 \\ 0 & 17/3 & -2/3 & 1/3 \\ 0 & -11/3 & 14/3 & 20/3 \end{array}\right) (3/17)$$

$$\left(\begin{array}{ccc|c} 1 & -1/3 & -2/3 & 1/3 \\ 0 & 1 & -2/17 & 1/17 \\ 0 & -11/3 & 14/3 & 20/3 \end{array}\right) \longrightarrow R_3 + 11/3 R_2 \left(\begin{array}{ccc|c} 1 & -1/3 & -2/3 & 1/3 \\ 0 & 1 & -2/17 & 1/17 \\ 0 & 0 & 72/17 & 117/17 \end{array}\right) (17/72)$$

$$\left(\begin{array}{ccc|c} 1 & -1/3 & -2/3 & 1/3 \\ 0 & 1 & -2/17 & 1/17 \\ 0 & 0 & 1 & 13/8 \end{array}\right) \longrightarrow \begin{array}{l} R_1 + 2/3 R_3 \\ R_2 + 2/17 R_3 \end{array} \left(\begin{array}{ccc|c} 1 & -1/3 & 0 & 17/12 \\ 0 & 1 & 0 & 1/4 \\ 0 & 0 & 1 & 13/8 \end{array}\right)$$

$$R_1 + 1/3 R_3 \left(\begin{array}{ccc|c} 1 & 0 & 0 & 5/2 \\ 0 & 1 & 0 & 1/4 \\ 0 & 0 & 1 & 13/8 \end{array}\right) \therefore$$

$I_1 = 3/2 A = 1.5 A = 1500 mA$

$I_2 = 1/4 A = 0.25 A = 250 mA$

$I_3 = 13/8 A = 1.62 A = 1620 mA$