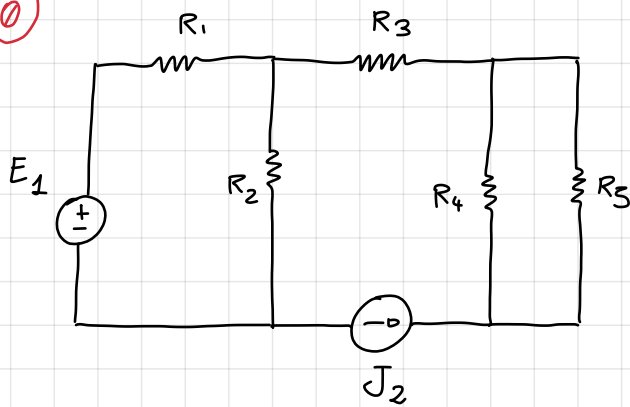


0



DATI

$$E_1 = 20V$$

$$J_2 = 1.2A$$

$$A \ R_1 = 10\Omega$$

$$B \ R_2 = 20\Omega$$

$$C \ R_3 = 12\Omega$$

$$D \ R_4 = 30\Omega$$

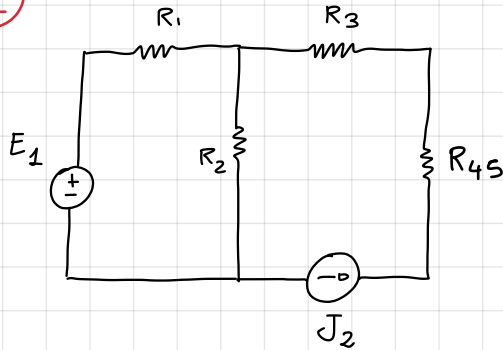
$$E \ R_5 = 30\Omega$$

$$Q_1: P_{E_1}^e = ? \quad P_{J_2}^e = ?$$

$$Q_2: P_{R_2}^a = ?$$

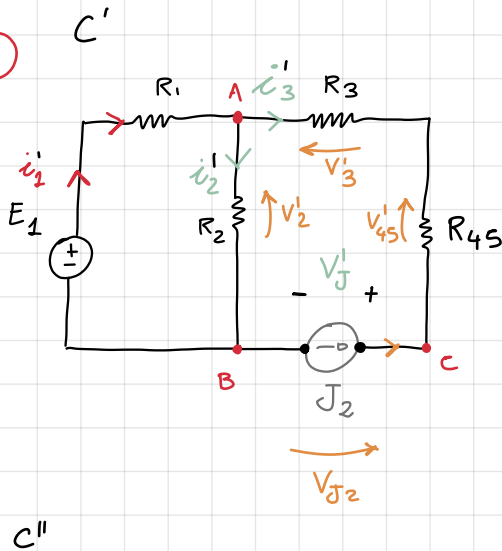
$$Q_3: J_2 / P_{E_1}^e < 0$$

1



$$\rightarrow R_{45} = R_4 // R_5 = 15\Omega$$

2



$$R_{eq} = R_1 + R_2 = 30\Omega$$

$$\Rightarrow V = R \cdot i \rightarrow i_1' = \frac{E}{R_{eq}} = \frac{20}{30} = 0.67A$$

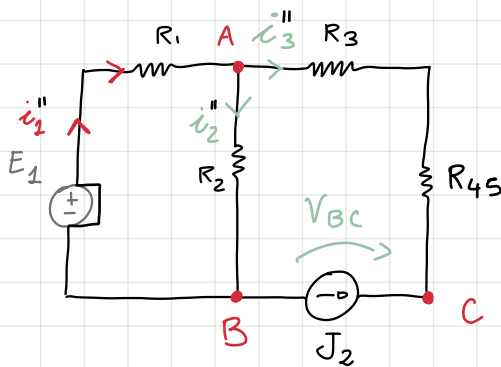
$$i_1' = i_2' = 0.67A$$

$$i_3' = 0A$$

$$\rightarrow V_J' - V_2' + V_3' + V_{45}' = 0 \rightarrow V_J' = V_2' - V_3' - V_{45}'$$

$$\Rightarrow V_J' = V_2' \rightarrow V_J' = i_2' \cdot R_2 = 13.33V$$

C''



$$R_{AB}'' = (R_1 // R_2) + R_3 + R_{45} = 33.67\Omega$$

$$\Rightarrow V = R \cdot i \rightarrow V_{BC} = R_{AB}'' \cdot J_2 = 40.4V$$

$$J_2 = -i_3''$$

$$\Rightarrow i_3'' = -1.2A$$

$$i_1'' = i_3'' \cdot \frac{R_2}{R_2 + R_1} = -0.8A$$

$$\Rightarrow \text{LK } C_A: i_3'' + i_2'' - i_1' = 0 \rightarrow i_2'' = i_1' - i_3'' = 0.67 + 1.2 = 1.87A$$

TIRIAMO LE SOMME

$$\rightarrow i_1 = i_1'' + i_1' = 0.67 \text{ A} - 0.8 \text{ A} = -0.13 \text{ A} \quad i_1$$

$$i_2 = 0.4 + 0.67 = 1.07 \text{ A} \quad i_2$$

$$V_{BC} = 40.4 + 13.33 = 53.73 \text{ V}$$

CALCOLO DELLE POTENZE

$$\rightarrow P_{R_2} = i_2^2 \cdot R_2 = 22.9 \text{ W} \quad P_{R_2}^a$$

$$P_{E_1}^e = E_1 \cdot i_1 = 20 \cdot (-0.13) = -2.6 \text{ W} \quad P_{E_1}^e \rightarrow \text{ASSORBE } 2.6 \text{ W}$$

$$P_{J_2}^e = J_2 \cdot V_{BC} = 53.73 \cdot 1.2 \text{ A} = 64.48 \text{ W} \quad P_{J_2}^e \rightarrow \text{EROGA}$$

Affinché $J_2 / P_{E_1}^e < 0 \rightarrow i_1 = i_1' + i_1'' > 0$

$$\Rightarrow i_3'' \cdot \frac{R_2}{R_2 + R_1} + \frac{E_0}{R_1 + R_2} > 0 \quad \rightarrow -J_2 \frac{R_2}{R_2 + R_1} + \frac{E_0}{R_1 + R_2} > 0$$

i_1'' i_1' \uparrow Dipende da J_2

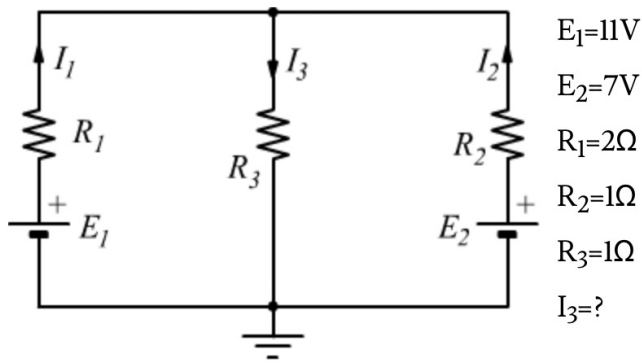
$$\rightarrow \frac{E_0 - J_2 R_2}{R_1 + R_2}$$

$$N \cdot E_0 - J_2 R_2 > 0 \rightarrow J_2 > \frac{E_0}{R_2} \rightarrow J_2 > 1 \text{ A} \quad \text{Ans}_3$$

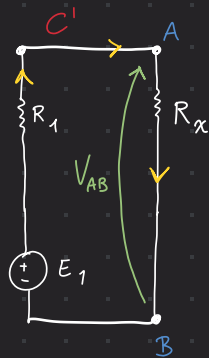
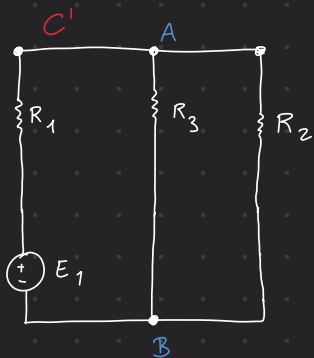
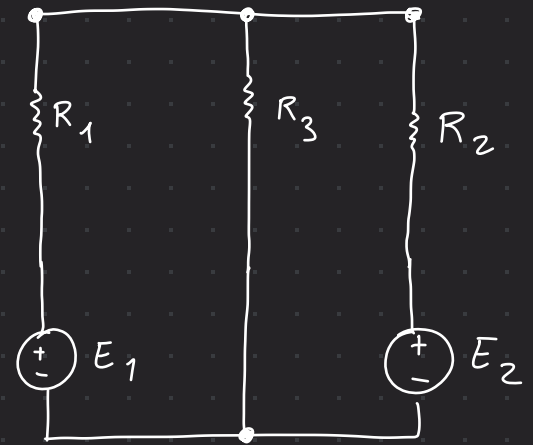
D: > 0 SEMPRE

Esercizio 1

Utilizzando il p.s.e. trovare la corrente I_3



$[I_3 = 5A]$



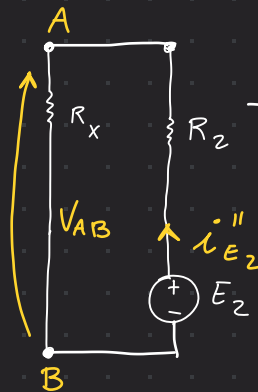
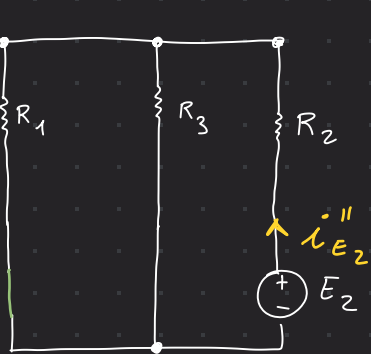
• Trovo i_{E1}

$$R_{eq} = (R_3 \parallel R_2) + R_1 = 2.5 \Omega$$

$$\Rightarrow i_{E1} = \frac{E_1}{R_{eq}} = 4.4 A$$

$$i_3' = i_{E1} \cdot \frac{R_2}{R_3 + R_2} = 2.2 A$$

$$V_{AB} = i_{E1} \cdot R_x = 4.4 \cdot \frac{1}{2} = 2.2 V$$



• Trovo i_{E2}

$$\Rightarrow R_{eq} = (R_1 \parallel R_3) + R_2 = \frac{5}{3} \Omega$$

$$\Rightarrow i_{E2} = \frac{E_2}{R_{eq}} = 4.2 A$$

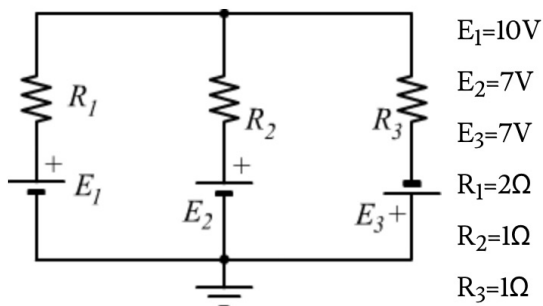
$$\Rightarrow i_3'' = i_{E2} \cdot \frac{R_1}{R_1 + R_3} = 2.8$$

$$\Rightarrow I = i_{E1}' + i_{E2}'' = 2.2 + 2.8 = 5 A \quad i_3$$

$$V = V_{AB}' + V_{AB}'' = 2.8 + 2.2 = 5 V$$

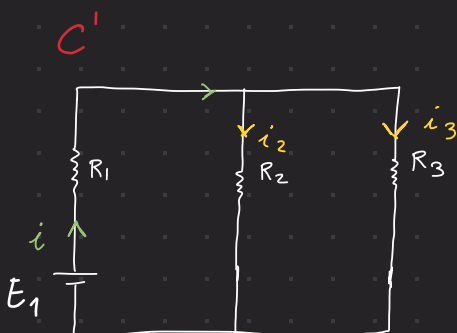
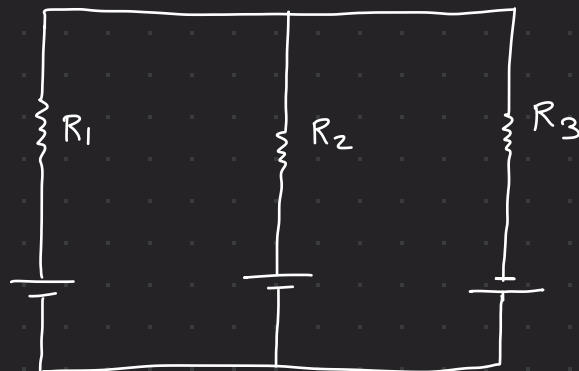
Esercizio 2

Utilizzando il p.s.e. trovare la corrente I_3



$I_3=?$

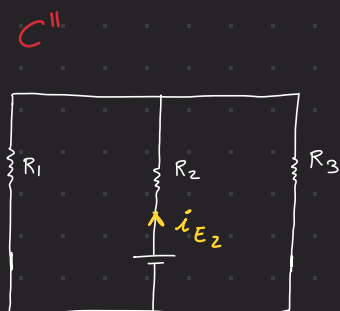
$[I_3=9A]$



• Trovo i_{E1} -> $R_{eq} = (R_2 \parallel R_3) + R_1$
 $= \frac{5}{2} = 2.5 \Omega$

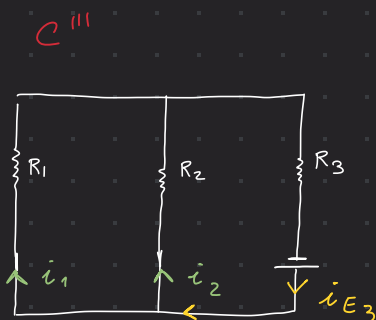
-> $i_{E1} = \frac{E_1}{R_{eq}} = 4 A$

$i_3^I = i \cdot \frac{R_2}{R_2 + R_3} = \underline{2 A}$



$i_{E2} = \frac{E_2}{R_{eq}} = 4.2 A$

-> $i_3^{II} = i_{E2} \cdot \frac{R_1}{R_3 + R_1} = \underline{2.8 A}$



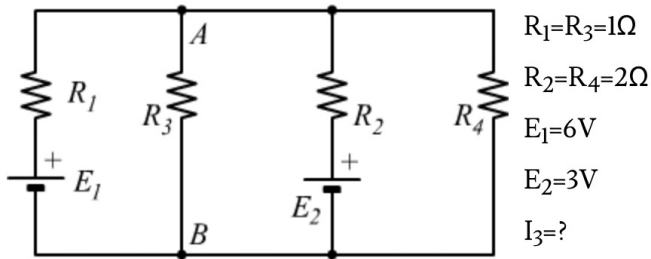
$i_{E3} = \frac{E_3}{R_{eq}} = \underline{4.2 A}$

=> $I_3 = i_3^I + i_3^{II} + i_3^{III} = 4.2 + 2.8 + 2 = \underline{9 A} \text{ Ans}$

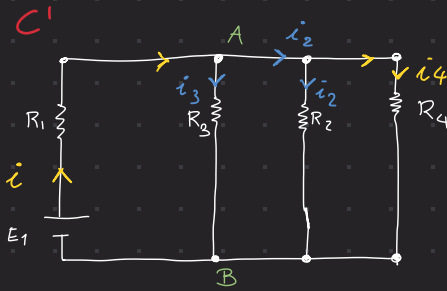
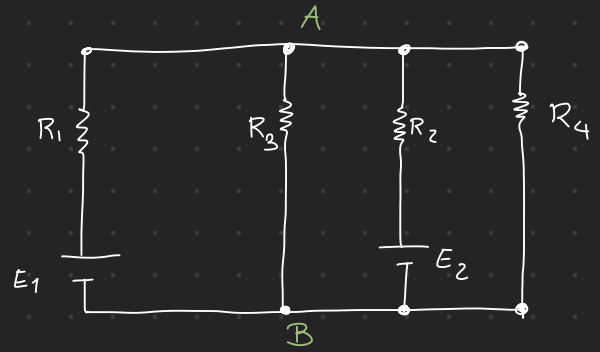
Time 13'

Esercizio 3

Utilizzando il p.s.e. trovare la corrente I_3

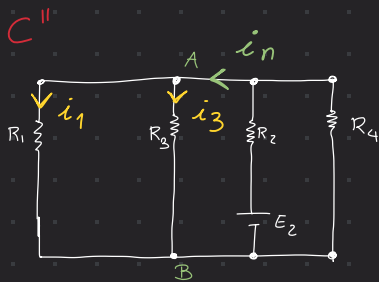


$[I_3 = 2.5A]$



$$R_x = R_2 \parallel R_4 = 1\Omega \quad \rightarrow \quad i_3 = i_E \cdot \frac{R_x}{R_3 + R_x}$$

$$\rightarrow i_3' = \left[\frac{E_1}{(R_2 \parallel R_4) \parallel R_3} + R_1 \right] \cdot \frac{1}{2} = 2A$$



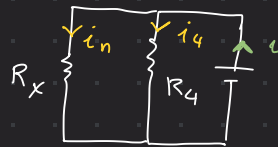
$$i_{E_2}'' = \frac{E_2}{R_{eq}} \quad \text{con}$$

$$= 1.25A$$

$$R_{eq} = \left[(R_1 \parallel R_3) \parallel R_4 \right] + R_2$$

$$= 2.4\Omega$$

$$\Rightarrow R_x = R_1 \parallel R_3 = \frac{1}{2}\Omega$$



$$\rightarrow i_n = i_E'' \cdot \frac{R_4}{R_x + R_4}$$

$$= 1A$$

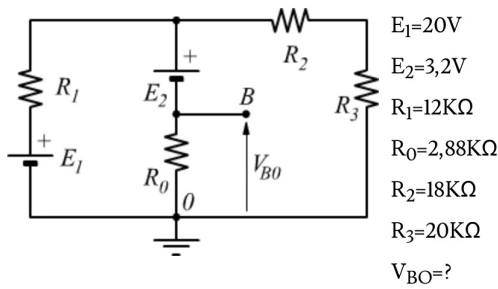
$$\Rightarrow i_3 = i_n \cdot \frac{R_1}{R_1 + R_3} = \frac{1}{2}A$$

$$\Rightarrow i_3 = i_3' + i_3'' = \frac{1}{2} + 2 = 2.5A \quad \text{Ans}$$

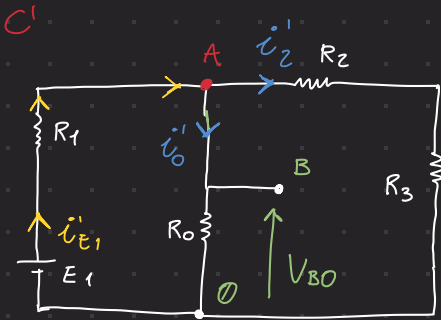
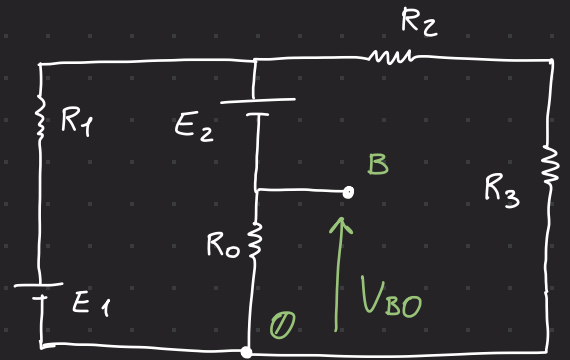
Time ~25'

Esercizio 4

Utilizzando il principio di sovrapposizione degli effetti, determinare il valore della caduta di tensione ai capi di R_0



[Risp.: $V_{BO}=2.88V$]



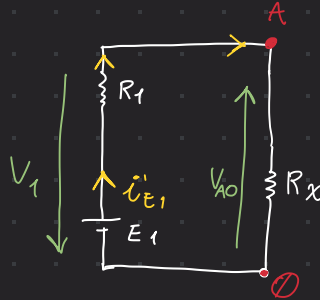
$$V_{BO} = V_{AO} = 0$$

Circuito eq

$$R_x = (R_2 + R_3) \parallel R_0$$

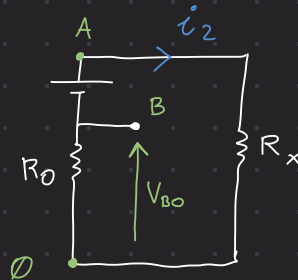
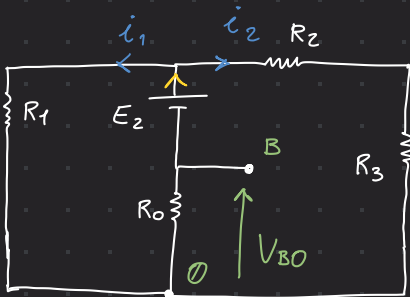
$$= 2677.1 \Omega$$

$$= 2.67 K\Omega$$



Partitore di tensione

$$V'_{AO} = V_1 \cdot \frac{R_x}{R_x + R_1} = 20V \cdot \frac{2.67 \times 10^3}{(2.67 + 12) \times 10^3} = 3.64V$$



$$R_x = (R_2 + R_3) \parallel R_1$$

$$= 9.12 \Omega$$

$$i''_{E_2} = \frac{E_2}{R_{eq}} = \frac{E_2}{R_x + R_0} = 0.267A$$

non so che fare
abbiamo fatto i ke...

$$V_{BO} = R_0 \cdot i_2 = 0.768V = -V''_{OB}$$