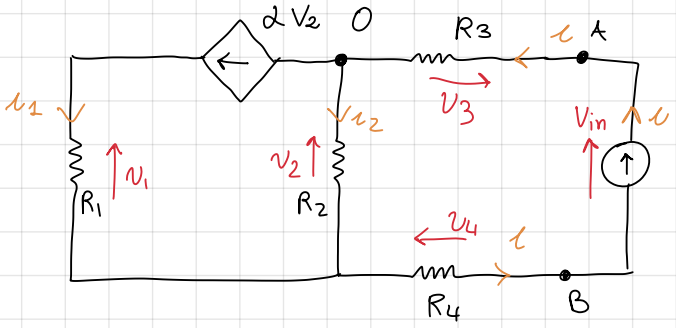
ESEMPIO 1



A $R_1 = 20\,\Omega$
B $R_2 = 40\,\Omega$
C $R_3 = 30\,\Omega$
D $R_4 = 30\,\Omega$

$\alpha = 1.5\ s$

$[\alpha] = \frac{1}{R} =$ Seamens

Q: Req tra A e B

$\rightarrow R_{AB} = \frac{V_{in}}{i}$?

LKC_O: $-i + i_2 + i_1 = 0$

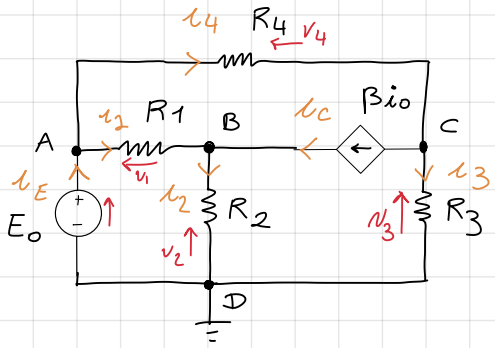
$i_1 = \alpha V_2$ $\rightarrow$ $-i + i_2 + \alpha V_2 = 0$ ma $i_2 = \frac{V_2}{R_2}$ $\rightarrow$ $-i + \frac{V_2}{R_2} + \alpha V_2 = 0$

$\Rightarrow V_2 = \frac{i}{\frac{1}{R_2} + \alpha} = \underline{0.66\ V}\ V_2$

$\rightarrow LKT_{M_1}$: $V_{in} = V_4 + V_2 + V_3 = i(R_4 + R_3) + V_2 =$ 61 V

$\Rightarrow Req = \frac{V_{in}}{i} \rightarrow$ $Req = 61\,\Omega$ Ans

ESEMPIO 2



Q: U_A, U_B, U_C

$U_D = 0 = 0$

$$\begin{cases} E_0 = U_A \\ v_1 = U_A - U_B \\ v_2 = U_B \\ v_3 = U_C \\ v_4 = U_A - U_C \end{cases}$$

DATI

$E_0 = 6\,V$
$R_1 = 20$
$R_2 = 40$
$R_3 = 50$
$R_4 = 100\,\Omega$
$\beta = 2.4\ \ A/A$

$V = R \cdot i \to i = \frac{V}{R}$

LKC

A: $-i_E + i_2 + i_4 = 0$
B: $-i_1 + i_2 - i_C = 0$
C: $-i_4 + i_C + i_3 = 0$

$i_C = \beta i_E$

$$\begin{cases} -i_E + i_1 + i_4 = 0 \\ -i_1 + i_2 - \beta i_E = 0 \\ -i_4 + \beta i_E + i_3 = 0 \end{cases}$$

$$i_1 = \frac{v_1}{R_1} = \frac{U_A}{R_1} - \frac{U_B}{R_1}$$

$$i_2 = \frac{U_B}{R_2}$$

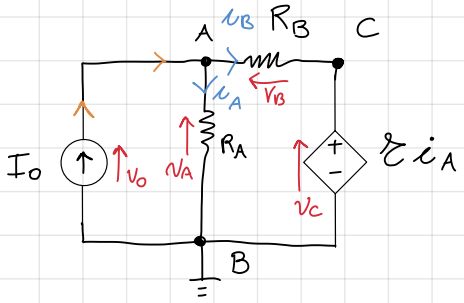
$$i_3 = \frac{U_C}{R_3}$$

$$i_4 = \frac{U_A}{R_4} - \frac{U_C}{R_4}$$

$= 0$

$$\begin{cases} -i_E + \frac{U_A}{R_1} - \frac{U_B}{R_1} + \frac{U_A}{R_4} - \frac{U_C}{R_4} = 0 \\ -\frac{U_A}{R_1} + \frac{U_B}{R_1} + \frac{U_B}{R_2} - \beta i_E = 0 \\ -\frac{U_A}{R_4} + \frac{U_C}{R_4} + \beta i_E + \frac{U_C}{R_3} = 0 \end{cases}$$

ESEMPIO 3



DATI

C $I_0 = i_0 = 2\ mA = 2 \times 10^{-3} A$

A $R_A = 10\ k\Omega = 10 \times 10^3\ \Omega$

B $R_B = 6 \times 10^3\ \Omega$

D $\mathcal{E} = 4000\ \Omega$

Q: V_A

LKC_A: $\quad -i_0 + i_A + i_B = 0$

$$\begin{cases} V_0 = i_0\, R_{eq} \\ V_A = U_A \\ V_B = U_A - U_C \\ V_C = U_C = \mathcal{E} i_A \end{cases}$$

$V = R \cdot i \quad \rightleftharpoons \quad i = G \cdot V$

$\hookrightarrow i = \frac{V}{R}$

$$\Rightarrow -i_0 + G_A V_A + G_B U_A - G_B \mathcal{E} i_A = 0 \quad \Rightarrow \quad U_A (G_A + G_B - \mathcal{E} G_A G_B) = i_0$$

$$i_A = G_A U_A$$

$$\Rightarrow U_A = \frac{i_0}{G_A + G_B - \mathcal{E} G_A G_B} = 10\ V$$

Siccome $\quad V_A = U_A \Rightarrow$ $\quad V_A = 10\ V$ Ans