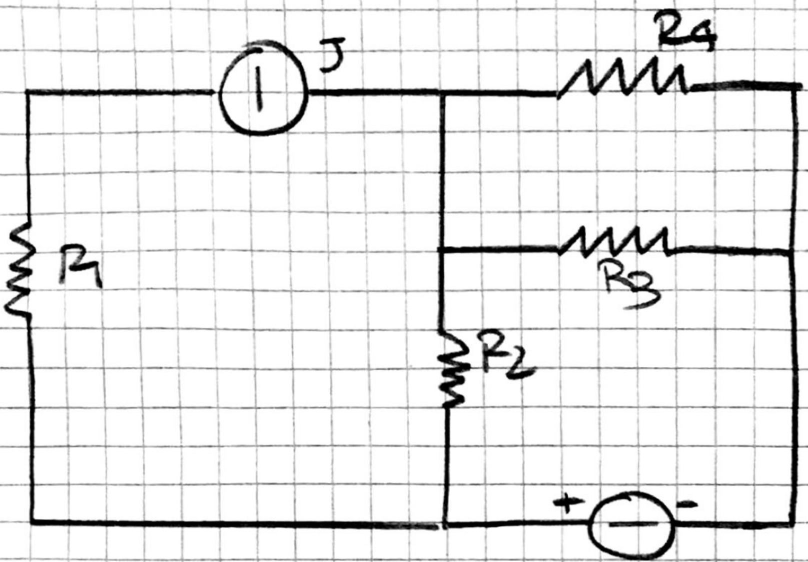
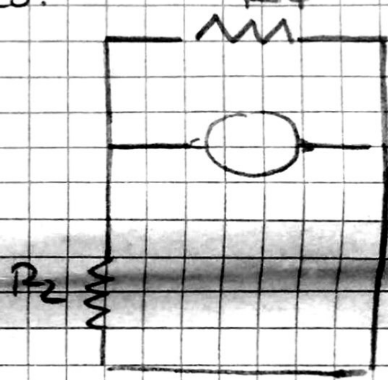
Calcolare il generatore equivalente di Norton visto dalla resistenza R_3

Elettrodi



Sostituisco R_3 con i morsetti.
Calcolo la R_{eq} e passivizzo i generatori mandando R_1 in corto circuito e ~~sostituisco~~ sostituisco i morsetti con un generatore di controllo.

$$R_{eq} = \frac{R_4 R_2}{R_4 + R_2} = \frac{10}{7}\ \Omega$$



$$i_{cc} = i_{ccJ} + i_{ccE}$$

Calcolo la i_{ccE} spegnendo il generatore di corrente che manda R_1 in corto circuito

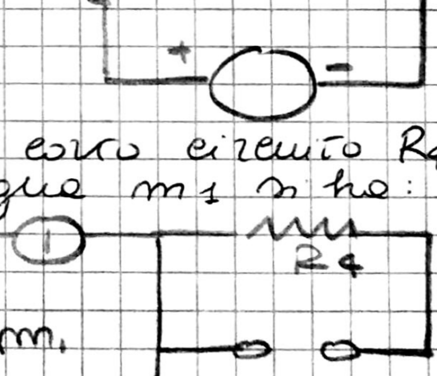
$V_4 = 0$

$i_4 = 0$

$i_{ccE} = i_{cc2}$

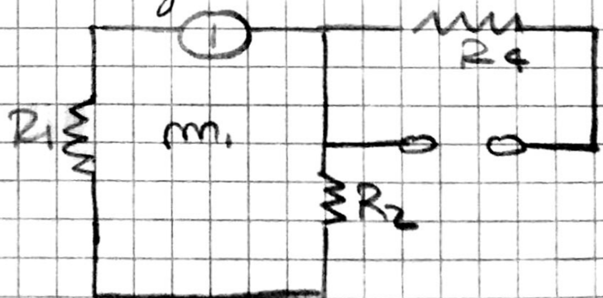
$V_2 = E(t) = 10V$

$$i_{ccE} = i_2 = \frac{V_2}{R_2} = \frac{10A}{2} = 5A$$



Il circuito aperto manda in corto circuito R_4, quindi considerando la maglia m_1 si ho:

$i_{ccJ} = 8A$



Spengo il generatore di tensione.
I morsetti mandano R_4 in corto circuito
Dunque

$$i_{cc} = i_{ccE} + i_{ccJ} = 10A$$

LA RESISTENZA

J-2

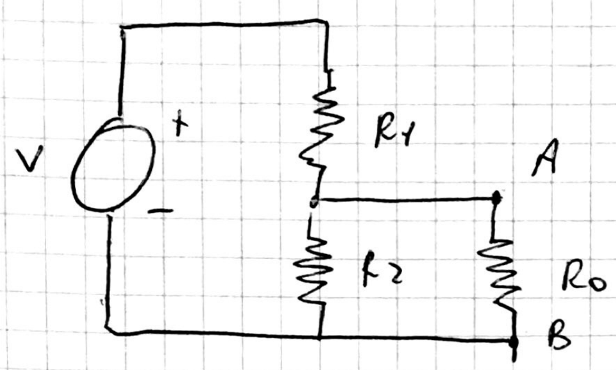
$I_{cc} = ?$ $R_{eq} = ?$

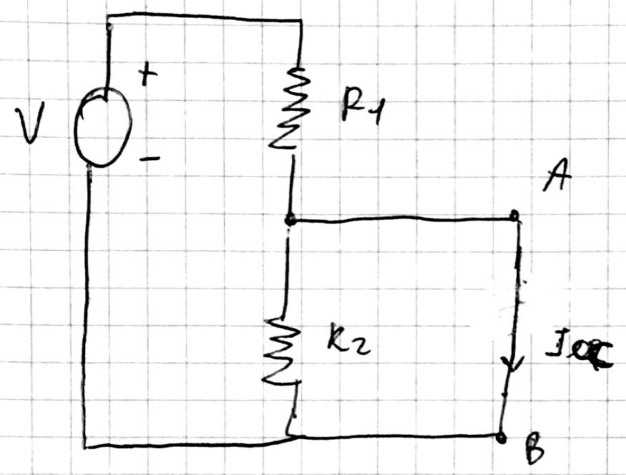
$R_1 = 5\,\Omega$ $R_2 = 10\,\Omega$

$V = 10\,V$ $R_0 = 20\,\Omega$

$I_{cc} = ?$

$R_{eq} = ?$

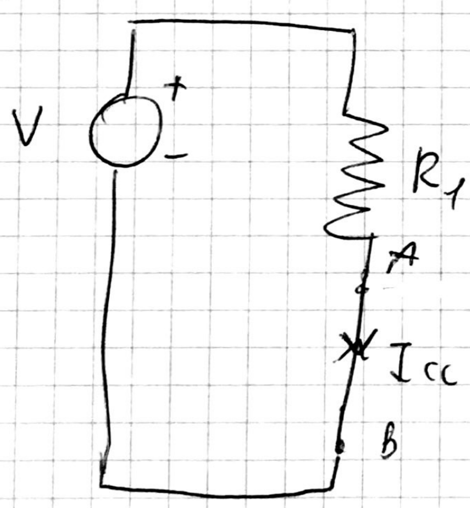




=> R_2 CORTOCIRCUITATA!

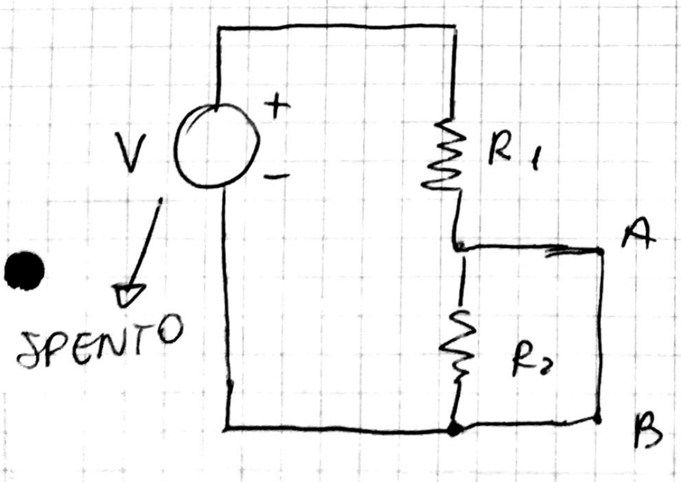
TENSIONE NULLA E QUINDI CORRENTE NULLA

=>



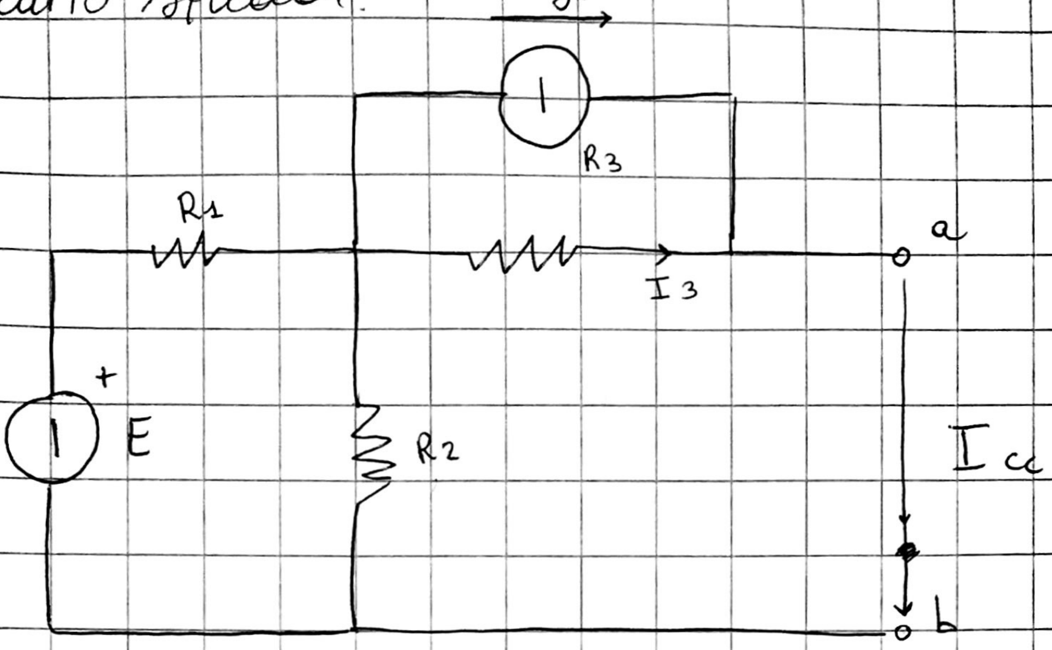
$$I_{cc} = \frac{V}{R_1} = \frac{10}{5} = 2A$$

Calcoliamo la resistenza equivalente.



$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{10(5)}{10+5} = \frac{50}{15} = \frac{10}{3}\,\Omega$$

Corto Circuito spuaol.



$R_1 = 1\,\Omega$; $R_2 = 4\,\Omega$; $J = 3A$; $R_3 = 2\,\Omega$; $E = 4V$; [redacted]

[redacted]

R_1 e R_2 sono in // → Calcolo Req, $R_{12} = \frac{R_1 \cdot R_2}{R_1 + R_2} = \frac{4}{5}\,\Omega$

R_{12} e R_3 sono in serie → Calcolo Req;

$$R_{123} = \frac{4}{5} + 2 = \frac{14}{5}\,\Omega$$

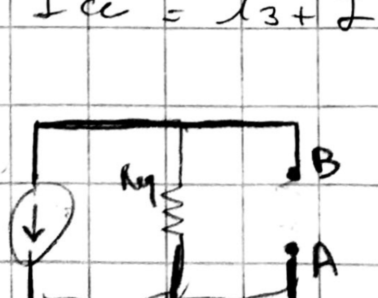
Con la I° legge di K. calcolo Icc al nodo A.

$$J + i_3 = I_{cc}$$

Ora con Millman mi calcolo la tensione tra A e B

$$V_{AB} = \frac{E/R_1 - J}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = \frac{4}{7}\,V \Rightarrow i_3 = \frac{V_{AB}}{R_3} = \frac{2}{7}\,\Omega$$

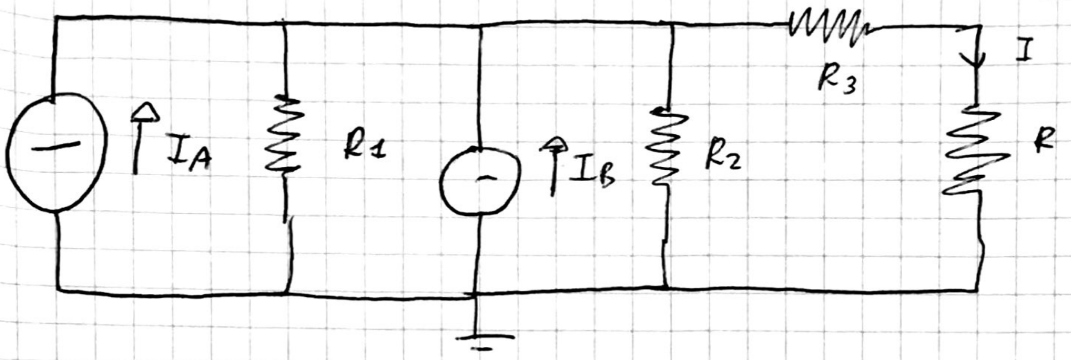
Quindi $I_{cc} = i_3 + J = \frac{23}{7}\,A$



THEVENIN

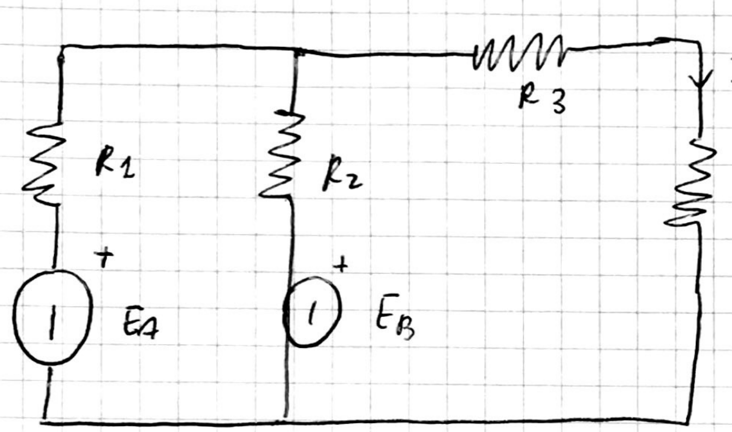
$I = ?$

~~CONDUTTORI OHMICI~~



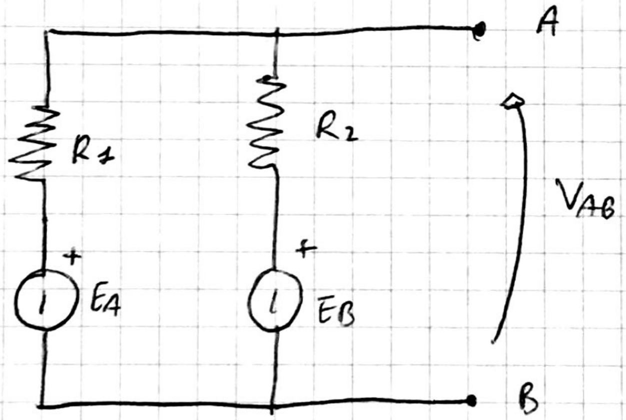
$I_A = 4A$ $\quad I_B = 6A$ $\quad R_3 = 2\Omega$ $\quad R = 10\Omega$

$R_1 = 8\Omega$ $\quad R_2 = 12\Omega$



$E_A = R_1 I_A = 4(8) = 32V$

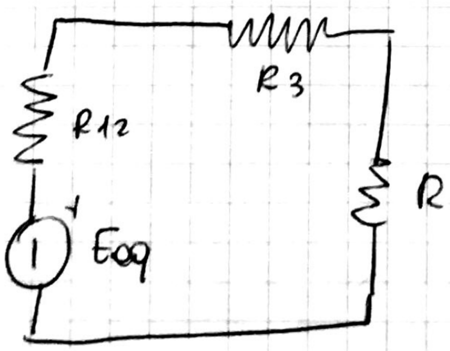
$E_B = R_2 I_B = 6(12) = 72V$



$$V_{AB} = \frac{E_A R_2}{R_1+R_2} + \frac{E_B R_1}{R_1+R_2} = \frac{32(12)}{20} + \frac{72(8)}{20} = 48V$$

$R_1 // R_2 \Rightarrow R_{12} = \frac{R_1 R_2}{R_1+R_2} = \frac{8(12)}{8+12} = \frac{24}{5}\Omega$

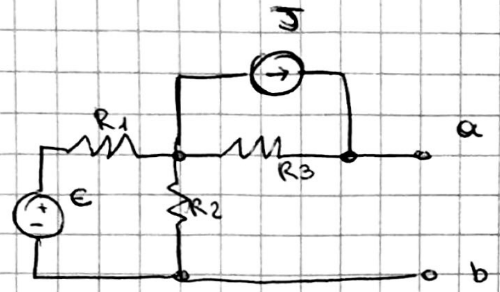
$$\Rightarrow I = \frac{E_{eq}}{R_{eq}} = \frac{E_q}{R_{12} + R_3 + R} = \frac{48}{\frac{24}{5} + 2 + 10} = \frac{20}{7} A$$



LA RESISTENZA

J — Z

Trovare le circuito equivalente di Norton tra i morsetti a-b



$R_1 = 1\,\Omega$

$R_2 = 4\,\Omega$

$R_3 = 2\,\Omega$

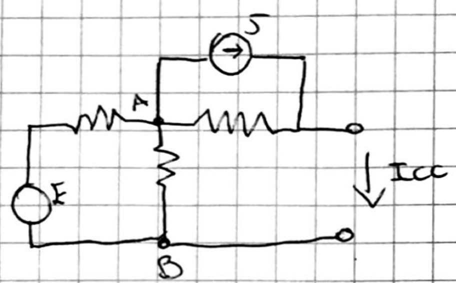
$E = 4V$

$J = 3A$

Spengo i generatori ⇒ calcolo Req

$R_1 // R_2 \Rightarrow R_{12} = \frac{R_1 R_2}{R_1 + R_2} = \frac{1(4)}{5} = \frac{4}{5}\,\Omega$

$R_{eq} = R_{12} + R_3 = \frac{14}{5}\,\Omega \Rightarrow R_{eq} = \frac{14}{5}\,\Omega$



$I_{cc} = i_3 + J$

Millman
↓

$V_{AB} = \frac{-E/R_1 - J}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = \frac{4}{7}\,V$

$i_3 = \frac{V_{AB}}{R_3} = \frac{2}{7}\,A$

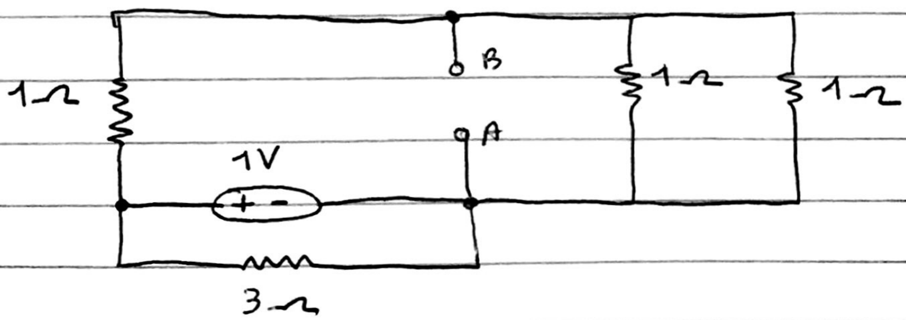
$I_{cc} = \frac{2}{7} + 3 = \frac{23}{7}\,A$

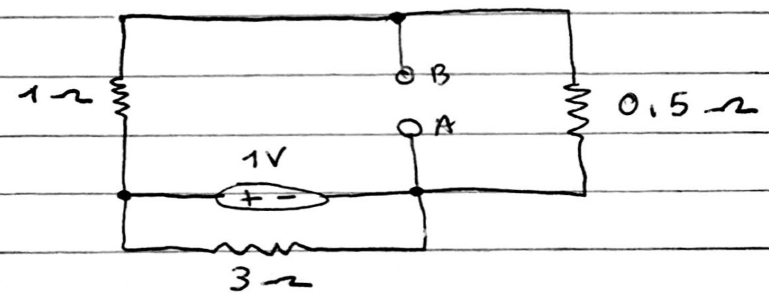
Team "I Condensator

I POTENZIALI - LEZIONE 5

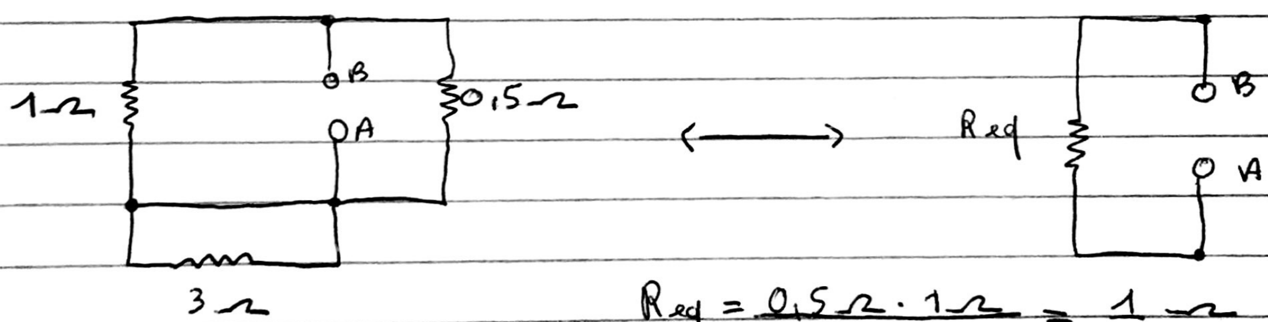
Questionari - Esercizio

Calcolare il generatore equivalente secondo Thevenin visto dai morsetti A-B.



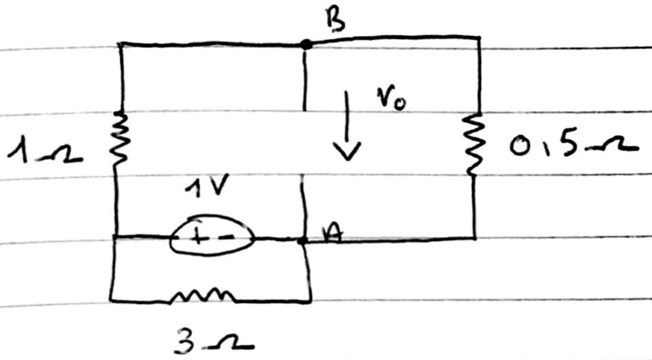


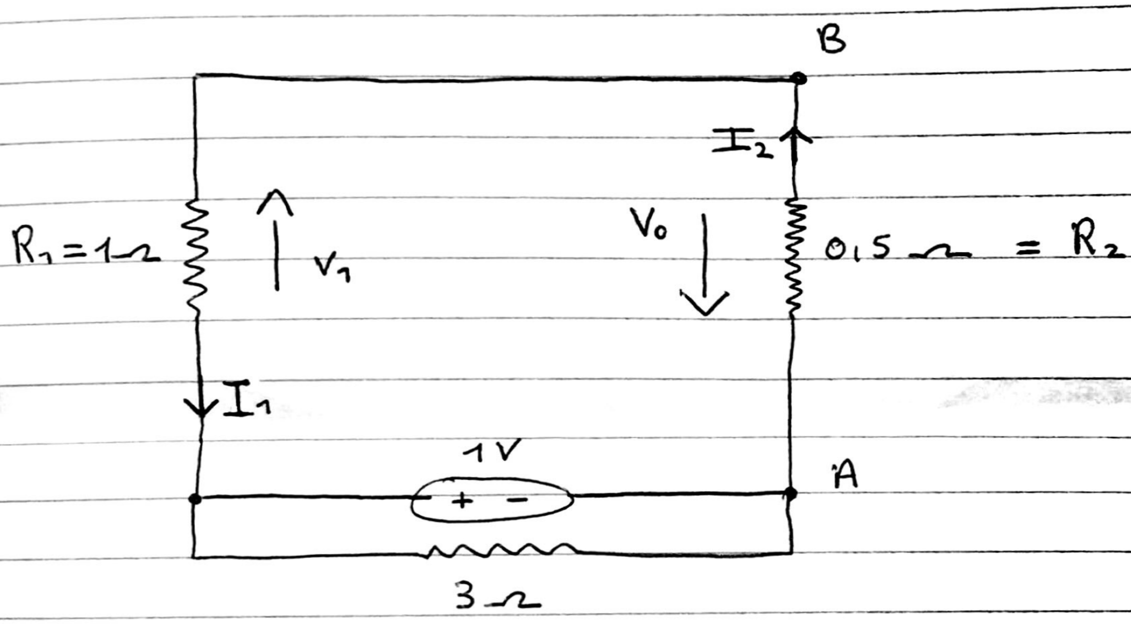
• Calcolo Req



$$R_{eq} = \frac{0,5\,\Omega \cdot 1\,\Omega}{1,5\,\Omega} = \frac{1}{3}\,\Omega$$

• Calcolo V_0





LKT :

$$\begin{cases} E + V_1 + V_0 = 0 \\ V_1 = I_1 R_1 = I_2 R_1 \\ V_0 = I_2 R_2 \end{cases}$$

$\Rightarrow \quad E + I_2 R_1 + I_2 R_2 = 0$

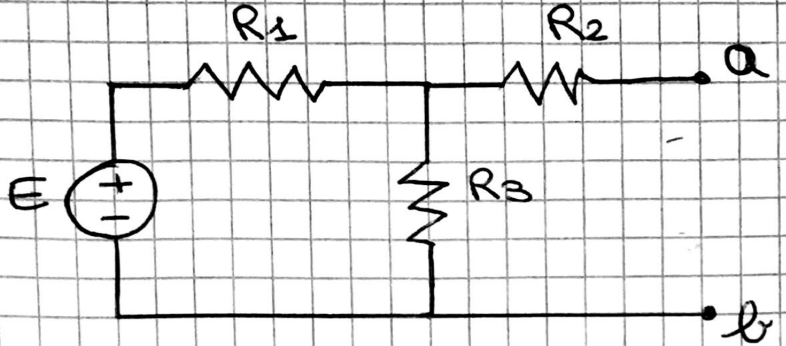
$\Rightarrow \quad E + I_2 (R_1 + R_2) = 0$

$\Rightarrow \quad I_2 = \dfrac{-E}{R_1 + R_2} = \dfrac{-1\,V}{1{,}5\,\Omega} = -0{,}66\ A$

$$V_0 = I_2 R_2 = -0{,}66\,A \cdot 0{,}5\,\Omega = -\frac{1}{3}\ V$$

ESERCIZIO - "GLI ELETTRIZZATI"

LEZIONE 5



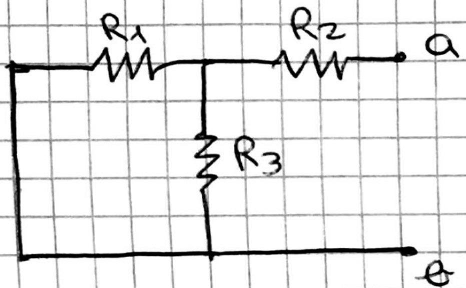
$E = 9\,V$

$R_1 = 1\,\Omega$

$R_2 = 3\,\Omega$

$R_3 = 2\,\Omega$

la Req si ottiene spegnendo l'unico generatore ovvero studiando:



$$R_{eq} = R_2 + \left(\frac{R_1 \cdot R_3}{R_1 + R_3}\right) = 3 + \frac{2}{3} = \frac{11}{3}\,\Omega$$

$$V_0 = E \cdot \frac{R_3}{R_1 + R_3} = 9 \cdot \frac{2}{3} = 6\,V$$

poiché V_0 si calcola valutando la tensione tra i morsetti aperti e, in queste condizioni, non circola corrente in R_2, si evince che V_0 è la tensione su R_3. Dato che R_1 e R_3 sono in serie, calcolo V_0 con un partitore di tensione.