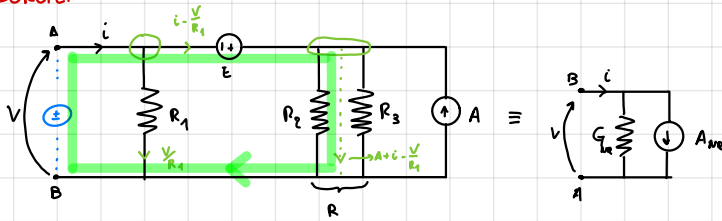


ESERCIZI



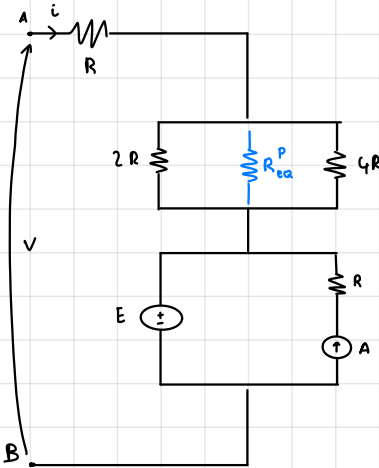
$$R = \frac{R_1 R_2}{R_1 + R_2}$$

parallelo di 2 resistenze

$$V + E - R(A + i - \frac{V}{R_1}) = 0 \rightarrow V + E - RA - Ri + \frac{VR}{R_1} = 0$$

$$+ Ri = +V + E - RA + V \frac{R}{R_1}$$

$$i = \frac{V}{R} + \frac{E}{R} - A + \frac{V}{R_1} = \underbrace{\frac{R_1 + R_2}{RR_1} V}_{G_{NR}} - \underbrace{A + \frac{E}{R}}_{A_{NR}}$$

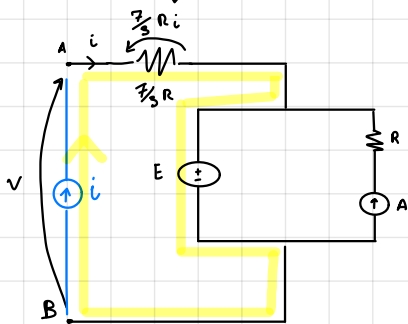


1) eq. Thevenin? ($V = R_{TH} i + E_{TH}$)

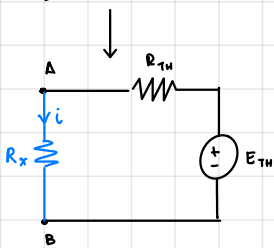
2) colleghiamo R_x ad A-B, il valore di R_x b.c. $p_a^{R_x}$ max.

$$R_{eq}^P = \frac{2R \cdot 4R}{2R + 4R} = \frac{8}{6} R$$

$$R_{eq} = R + R_{eq}^P = \frac{14}{3} R$$



$$V - \frac{7}{3} Ri - E = 0 \rightarrow V = \frac{7}{3} Ri + E \quad (1)$$



$$i = \frac{E_{TH}}{R_{TH} + R_x}$$

$$p_a^{R_x} = Ri^2 = \frac{R_x E_{TH}^2}{(R_x + R_{TH})^2}$$

$$\frac{d}{dR_x} p_a(R_x) = 0 \rightarrow E_{TH}^2 (R_x + R_{TH})^{-2} - 2 R_x E_{TH}^2 (R_x + R_{TH})^{-3} = \frac{E_{TH}^2}{(R_x + R_{TH})^2} \left[1 - \frac{2R_x}{R_x + R_{TH}} \right] = 0$$

$$R_x + R_{TH} - 2R_x = 0 \Rightarrow R_x = R_{TH} \quad (2)$$

$$p_a^{R_{TH}} = \frac{E_{TH}^2}{4R_{TH}} \quad (2)$$

5 TRIPOLI



$$E_a \text{ COSTITUTIVE: } \begin{cases} f_1(v_1, v_2, i_1, i_2) = 0 \\ f_2(v_1, v_2, i_1, i_2) = 0 \end{cases}$$

Noi consideriamo il caso di tripoli lineari affini dinamici. Le eq. costitutive diventeranno:

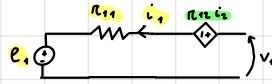
$$\begin{cases} a_{11} v_1 + a_{12} v_2 + b_{11} i_1 + b_{12} i_2 + c_1 = 0 \\ a_{21} v_1 + a_{22} v_2 + b_{21} i_1 + b_{22} i_2 + c_2 = 0 \end{cases} \rightarrow A \underline{v} + B \underline{i} + \underline{c} = 0$$

5.1 GENERATORI PILOTATI

Consideriamo $A \underline{v} + B \underline{i} + \underline{c} = 0$. Se esiste la base corrente allora:

$$\underline{v} = -\underbrace{A^{-1}B}_{= R} \underline{i} - \underbrace{A^{-1}\underline{c}}_{= \underline{e}} \Rightarrow |\underline{A}| \neq 0 \rightarrow \begin{cases} v_1 = r_{11} i_1 + r_{12} i_2 + e_1 \\ v_2 = r_{21} i_1 + r_{22} i_2 + e_2 \end{cases} \rightarrow \text{Thévenin}$$

La parte evidenziata corrisponde ad un circuito equivalente di Thévenin più un extra. L'extra è un GENERATORE DI TENSIONE CONTROLLATO IN CORRENTE:



•
• TODO
•

Se esiste la base tensione:

$$\underline{i} = \underbrace{-B^{-1}A}_{= G} \underline{v} - \underbrace{B^{-1}\underline{c}}_{= \underline{e}} \Rightarrow |\underline{B}| \neq 0$$

La matrice R contiene resistenze, mentre G contiene conduttanze. Quindi: $R^{-1} = G$