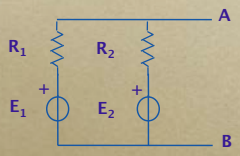
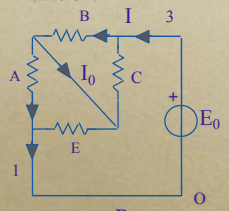
Esercitazione 11

Esercizi



Determinare la d.d.p. tra I morsetti A e B

Ponte in equilibrio



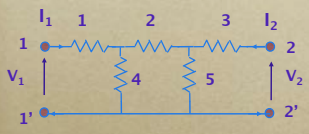
$R_A = 1\ \Omega;$
$R_B = 1\ \Omega;$
$R_C = 3\ \Omega;$
$R_E = 3\ \Omega;$
$R_D = 3\ \Omega;$
$E_0 = 3V.$

$$I_B = I\frac{R_C}{R_B + R_C}$$

$$I_A = I\frac{R_E}{R_A + R_E}$$

$$\Longrightarrow \quad R_B R_E = R_A R_C$$

Esercizi:
Matrice delle R e delle G



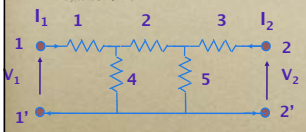
$$R_{11} = \frac{(R_2 + R_5)\,R_4}{R_2 + R_5 + R_4} + R_1$$

$$R_{22} = \frac{(R_2 + R_4)\,R_5}{R_2 + R_5 + R_4} + R_3$$

$$R_m = \frac{R_5\,R_4}{R_2 + R_5 + R_4}$$

$$R_{rs} = \left.\frac{V_r}{I_s}\right|_{\substack{I_i = 0 \\ i \neq s}}$$

Esercizi:
Matrice delle R e delle G



$$G_{11} = \left[\frac{(R_e + R_2)\, R_4}{R_2 + R_e + R_4} + R_1 \right]^{-1}$$

$$G_{rs} = \left. \frac{I_r}{V_s} \right|_{\substack{V_i = 0 \\ i \neq s}} \qquad R_e = \frac{R_3\, R_5}{R_3 + R_5}$$

$$G_m = \frac{-\, R_4\, R_5 \,/(R_3 + R_5)}{(R_2 + R_e + R_4)\, R_1 \;\; + (R_2 + R_e)\, R_4}$$

Esercizi:
Condizioni di fisica realizzabilità

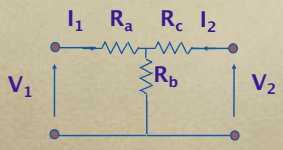
$$\begin{vmatrix} 4 & 2 \\ 2 & 3 \end{vmatrix}$$

$$\begin{vmatrix} 2 & -3 \\ -3 & 4 \end{vmatrix}$$

Delle seguenti matrici R di un doppio bipolo, quale non soddisfa le condizioni di fisica realizzabilità e perché.

Esercizi:
Condizioni di fisica realizzabilità

$$\begin{vmatrix} 4 & 2 \\ 2 & 3 \end{vmatrix}$$



$R_a = 2\ \Omega;$
$R_b = 2\Omega;$
$R_c = 1\Omega.$

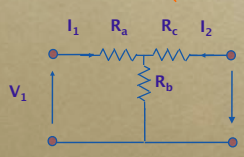
Esercizi:
Condizioni di fisica realizzabilità

$$\begin{vmatrix} 2 & -3 \\ -3 & 4 \end{vmatrix}$$

$R_{11} = R_a + R_b$
$R_{22} = R_c + R_b$
$R_m = R_b$

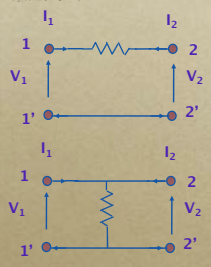
$\Longrightarrow$

$R_a = -1\ \Omega;$
$R_b = 3\ \Omega;$
$R_c = 1\ \Omega.$



Inversione morsetti

Esercizi:
Rappresentazioni possibili



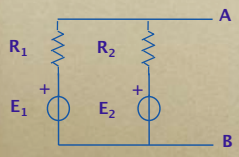
$$R_{12} = \left.\frac{V_1}{I_2}\right|_{I_1 = 0}$$

Solo matrice delle G

$$G_{12} = \left.\frac{I_1}{V_2}\right|_{V_1 = 0}$$

Solo matrice delle R

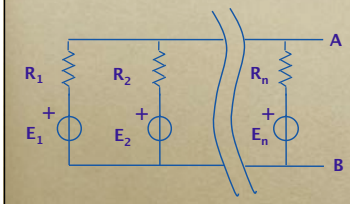
Esercizi:



Determinare la d.d.p. tra I morsetti A e B

$$V_{AB} = \left[\frac{E_1}{R_1} + \frac{E_2}{R_2}\right] \frac{R_1 R_2}{R_1 + R_2}$$

Esercizi:



Formula generale?

$$I_r = \frac{E_r - (V_A - V_B)}{R_r} \qquad V_A - V_B = \frac{\sum_r \frac{E_r}{R_r}}{\sum_r \frac{1}{R_r}}$$

Esercizi:
Matrici ibride e di trasmissione