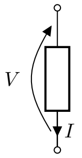
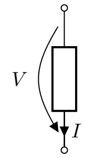
Bipolo

Utilizzatori



$$V = R \times I \text{ [V]}$$
$$P_{Ass} = V \times I \text{ [W]}$$
$$P_{Ero} = -V \times I \text{ [W]}$$

Generatori

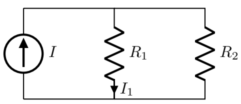


$$V = -R \times I \text{ [V]}$$
$$P_{Ass} = -V \times I \text{ [W]}$$
$$P_{Ero} = V \times I \text{ [W]}$$

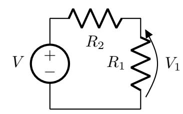
Teorema di Tellegen

$$\sum V_n \times I_n = 0$$

Partitori



$$I_1 = I \times \frac{R_2}{R_1 + R_2}$$



$$V_1 = V \times \frac{R_2}{R_1 + R_2}$$

Nota: Dovre è presente una maggiore resistenza, sarà presente una minore intensità di corrente ed una maggiore tensione.

	Serie	**Parallelo**
Corrente	$I = I_1 = \ldots = I_n$	$I = \sum I_n$
Tensione	$V = \sum V_n$	$V = V_1 = \ldots = V_n$

Trasformazioni

Stella $\rightarrow$ triangolo

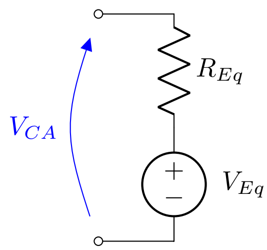
$$G_{12} = \frac{G_1 \times G_2}{\sum G_n}$$

Triangolo $\rightarrow$ stella

$$R_1 = \frac{R_{12} \times R_{13}}{\sum R_n}$$

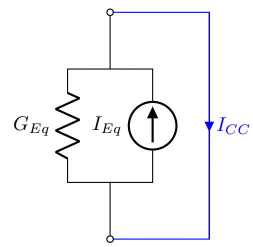
Equivalenti

Thévenin



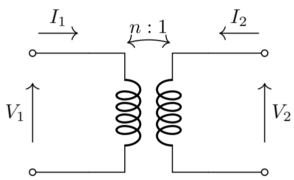
$$V_{Eq} = V_{CA}$$
$$R_{Eq} = \frac{1}{G_{Eq}}$$

Norton

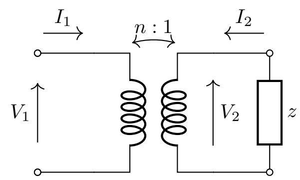


$$I_{Eq} = I_{CC}$$
$$R_{Eq} = \frac{1}{G_{Eq}}$$

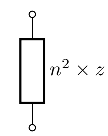
Trasformatore ideale



$$V_1 = n \times V_2$$
$$I_1 = -\frac{1}{n} \times V_2$$



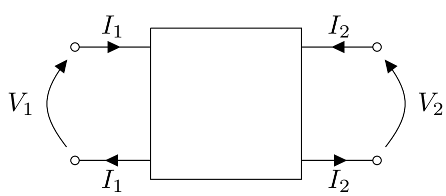
$$z_{AB} = n^2 \times z \iff$$



Doppi bipoli

$$R : \begin{bmatrix} V_1 \\ V_2 \end{bmatrix} = \begin{bmatrix} r_{11} & r_{12} \\ r_{21} & r_{22} \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \end{bmatrix} + \begin{bmatrix} \hat{V}_1 \\ \hat{V}_2 \end{bmatrix}$$

$$G : \begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \end{bmatrix} + \begin{bmatrix} \hat{I}_1 \\ \hat{I}_2 \end{bmatrix}$$



Ibride

$$H1 : \begin{bmatrix} V_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} I_1 \\ V_2 \end{bmatrix} + \begin{bmatrix} \hat{V}_1 \\ \hat{I}_2 \end{bmatrix}$$

$$H2 : \begin{bmatrix} I_1 \\ V_2 \end{bmatrix} = \begin{bmatrix} h'_{11} & h'_{12} \\ h'_{21} & h'_{22} \end{bmatrix} \begin{bmatrix} V_1 \\ I_2 \end{bmatrix} + \begin{bmatrix} \hat{I}_1 \\ \hat{V}_2 \end{bmatrix}$$

Trasmissione

$$\text{Diretta} : \begin{bmatrix} V_1 \\ I_1 \end{bmatrix} = \begin{bmatrix} t_{11} & t_{12} \\ t_{21} & t_{22} \end{bmatrix} \begin{bmatrix} V_2 \\ -I_2 \end{bmatrix} + \begin{bmatrix} \hat{V}_1 \\ \hat{I}_1 \end{bmatrix}$$

$$\text{Inversa} : \begin{bmatrix} V_2 \\ -I_2 \end{bmatrix} = \begin{bmatrix} t'_{11} & t'_{12} \\ t'_{21} & t'_{22} \end{bmatrix} \begin{bmatrix} V_1 \\ I_1 \end{bmatrix} + \begin{bmatrix} \hat{V}_2 \\ \hat{I}_2 \end{bmatrix}$$