

$$P_a(t) = v(t) \cdot i(t)$$

↑
Potenza Assorbita

(A) da dimostrare

Ipotesi di lavoro

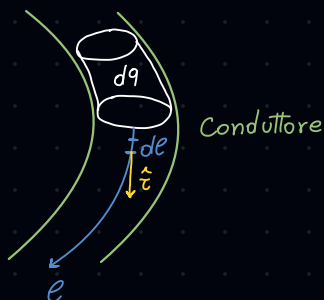
- Supponiamo che $v(t) = V_0 > 0$

$$V_A > V_B$$

$$dq = i(t) dt$$

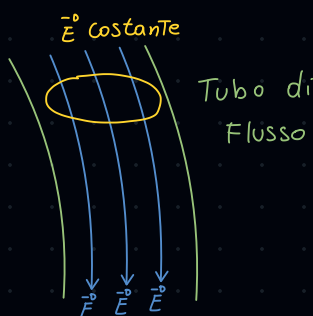
$$\Rightarrow dL = dq \cdot \vec{E} \cdot d\vec{e}$$

↑
Lavoro Elementare



#P: Dati $\begin{cases} l: \text{lunghezza conduttore} \\ S: \text{sezione} \end{cases}$

$l \gg \sqrt{S} \Rightarrow$ Il conduttore è un Tubo di flusso



$$\Rightarrow dL = dq \cdot E \cdot de \Rightarrow \frac{dL}{dt} = \frac{dq}{dt} \cdot E \cdot de \Rightarrow dW = \frac{dq}{dt} E \cdot de \Rightarrow W = \int_{A \rightarrow B} \frac{dq}{dt} E \cdot de$$

↑
Potenza Elementare

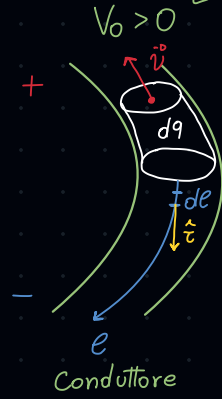
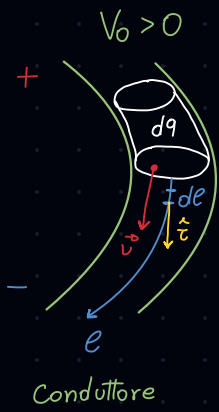
↑
Lavoro elem per unità di tempo

$$W_A = P_A = \int_{A \rightarrow B} \frac{dq}{dt} E \cdot de = v(t) \cdot i(t) \quad \text{QED}$$

↑
 $i(t)$ per $\#P(1) > 0$

↑
 $V_{AB} = v(t)$

Hp lavoro: $v(t) = V_0 < 0$



$$P_a(t) = \int_{A \rightarrow B} \left(\frac{dq}{dt} \right) \epsilon de$$

Negative

$$i(t) < 0 = i(t) \cdot v(t) > 0$$

$$\begin{matrix} <0 & & <0 \\ & \nearrow & & \nwarrow \\ & - \cdot - = + \end{matrix}$$

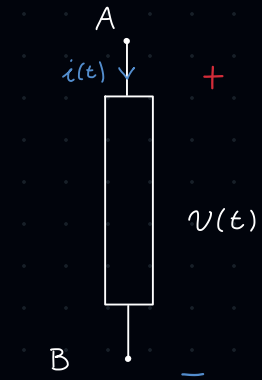
$$P_e(t) = v(t) \cdot i(t)$$

↑
Potenza erogata

}

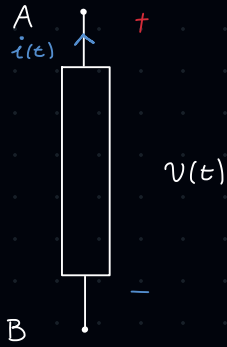
$$P_a(t) = -P_e(t)$$

Convenzioni di segno



$$P_a(t) = v(t) \cdot i(t)$$

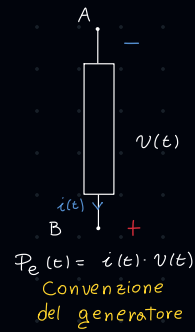
Convenzione dell'utilizzatore



$$P_e(t) = i(t) \cdot v(t)$$

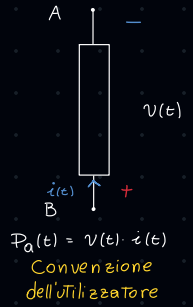
Convenzione del generatore

CASI ANALOGHI



$$P_e(t) = i(t) \cdot v(t)$$

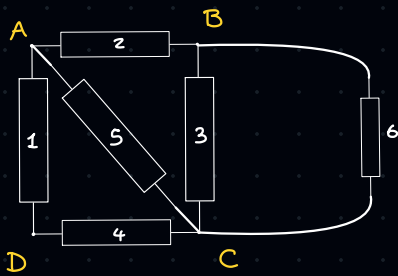
Convenzione del generatore



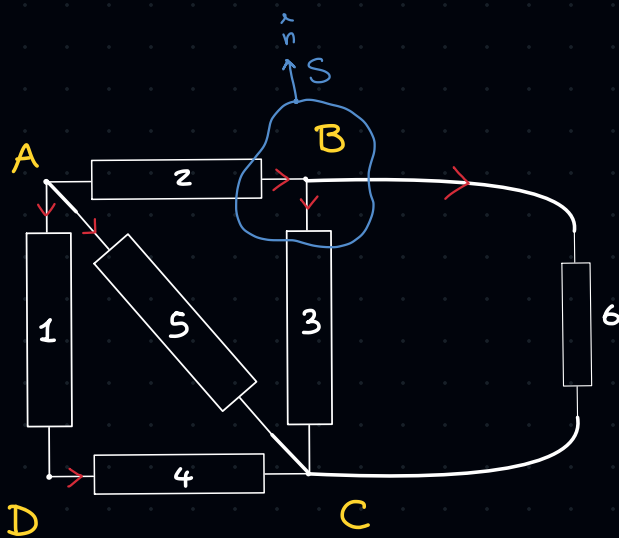
$$P_a(t) = v(t) \cdot i(t)$$

Convenzione dell'utilizzatore

Circuito Elettrico



- 6 Dipoli
- 4 Nodi



$$\left| \frac{dQ_m}{dt} \right| \ll |i(t)|$$

$$i_s(t) = - \frac{dQ_m}{dt}$$

Hp. Quasi stazionarietà

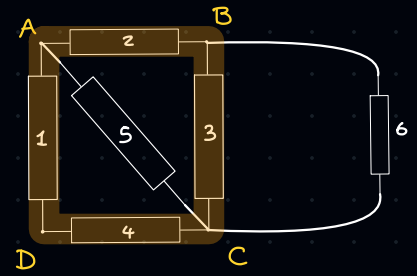
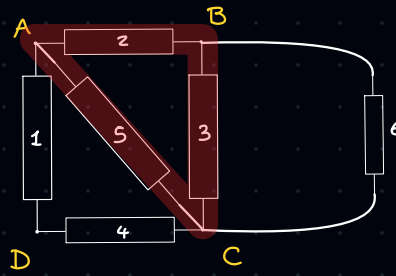
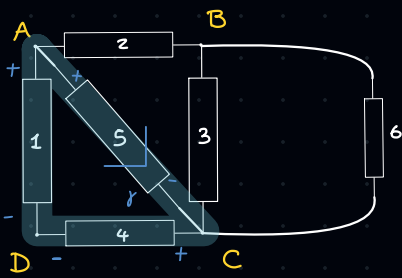
$$i_3(t) + i_6(t) - i_2(t) \approx - \frac{dQ_m}{dt} \approx 0$$

$$\begin{cases} A: i_1(t) + i_2(t) + i_3(t) = 0 \\ B: i_3(t) + i_6(t) - i_2(t) = 0 \\ C: - [i_4(t) + i_5(t) + i_3(t)] = 0 \\ D: i_4(t) - i_1(t) = 0 \end{cases}$$

$$\sum_k (\pm) i_k(t) = 0$$

Legge di Kirchhoff per le Correnti

L'eq C si ottiene come: $C = -eqD - eqA - eqB$



È molte Altre...

$$\oint_{\gamma} \vec{E} \cdot d\vec{e} = - \frac{d\phi_{\gamma}}{dt}$$

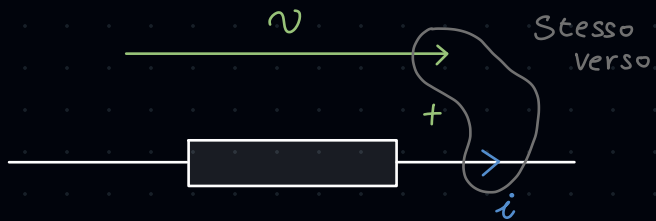
\downarrow \downarrow
 HP Quasi
 Staz.

$$v_4(t) - v_1(t) + v_5(t) = - \frac{d\phi_{\gamma}}{dt} \approx 0$$

$$\sum_k (\pm) v_k(t) = 0$$

\forall maglia

Conv. Alternative



generatore