$$I_{media} = \frac{\Delta q}{\Delta t}$$

$$I = \frac{dq}{dt}$$

$$I = n \cdot q \cdot v_d \cdot A \qquad J = I/A = n \cdot q \cdot v_d$$

conducibilità

$$\vec{J} = \sigma \vec{E}$$ legge di Ohm $\longrightarrow \Delta V = R \cdot I$

resistenza $R = \frac{\Delta V}{I}$ $[\Omega]$

resistività → quanto facilmente le cariche possono spostarsi → $\rho = \frac{1}{\sigma}$

$$R = \rho \cdot \frac{l}{A}$$

$$P = \frac{dU}{dt} = \frac{d}{dt}(Q \cdot \Delta V) = \frac{dQ}{dt} \cdot \Delta V = I \cdot \Delta V$$

$$\Delta V = R \cdot I$$

$$\rightarrow I^2 \cdot R$$

$$\rightarrow \frac{(\Delta V)^2}{R}$$

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$r = 1{,}25\ mm$ → dato di rame

$I = 3{,}7\ A$

$v_d = ?$

↳ $n = 8{,}46 \cdot 10^{28}\ e^-/m^3$

$$I = n \cdot q \cdot v_d \cdot A \qquad (A = \pi r^2)$$

$$v_d = \frac{I}{n q \pi r^2} = \frac{3{,}7}{(8{,}46 \cdot 10^{28}) \cdot (1{,}6 \cdot 10^{-19}) \pi \cdot (1{,}25 \cdot 10^{-3})^2}$$

• cosa succede a v_d se n aumenta

$$= \frac{3{,}7}{(8{,}46 \cdot 1{,}6 \cdot \pi \cdot 1{,}25) \cdot 10^3}$$

$$= \frac{3{,}7}{66{,}41} \cdot 10^{-3} = 0{,}0556 \cdot 10^{-3} = 5{,}56 \cdot 10^{-5}\ m/s$$

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$l = 50\ m$

$d = 2\ mm$

$\Delta V = 9{,}11\ V$

$I = 36\ A$

? di quale materiale è fatto il filo → assumo che sia ohmico

$$\rightarrow R = \frac{\Delta V}{I} = \frac{9{,}11}{36} = 0{,}253\ \Omega$$

$$R = \rho \cdot \frac{l}{A}$$

$$A = \pi r^2 = \pi \cdot (1 \cdot 10^{-3})^2 = \pi \cdot 10^{-6}$$

$$\rho = \frac{R \cdot A}{l} = \frac{0{,}253 \cdot \pi \cdot 10^{-6}}{50} = 1{,}59 \cdot 10^{-8}\ [\Omega \cdot m]$$

TABELLA 27.2 pag 814 → [Argento]

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due fili → Cu
→ Al

$l_{Al} = l_{Cu}$

$R_{Al} = R_{Cu}$

? r_{Al}/r_{Cu}

$$R = \rho \cdot \frac{L}{A}$$

$$\rho_{Cu} \cdot \frac{\cancel{l_{Cu}}}{\pi r_{Cu}^2} = \rho_{Al} \cdot \frac{\cancel{l_{Al}}}{\pi r_{Al}^2} = \frac{r_{Al}^2}{r_{Cu}^2} = \frac{\rho_{Al}}{\rho_{Cu}}$$

$$\frac{r_{Al}}{r_{Cu}} = \sqrt{\frac{\rho_{Al}}{\rho_{Cu}}} = \sqrt{\frac{2.82 \cdot 10^{-8}}{1.7 \cdot 10^{-8}}} = 1,29$$

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torre pone con una potenza = 1 kW

$\Delta V = 120\ V$

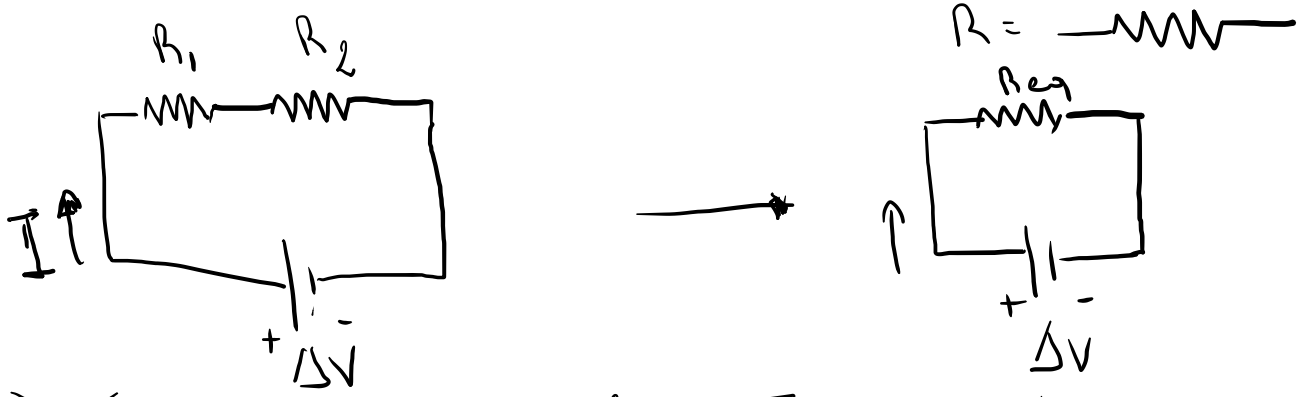
$I = ?$ $\quad R = ?$

$P = I \cdot \Delta V$

$I = P/\Delta V = \frac{1 \cdot 10^3}{120} = \frac{1000}{120} = 8{,}33\ A$

$R = \frac{\Delta V}{I} = \frac{120}{8{,}33} = 14{,}4\ \Omega$

• RESISTORI IN SERIE e in PARALLELO



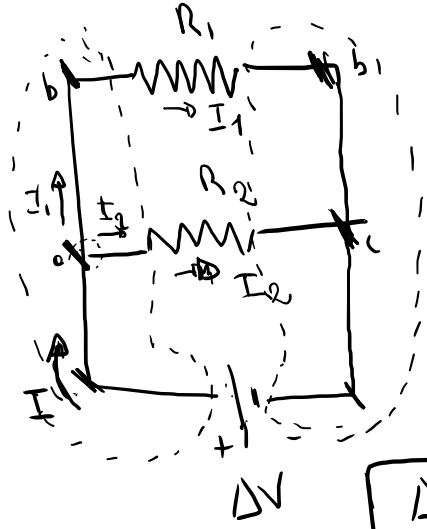
I_1
I_2 > è la stessa del ramo e I

$$\Delta V = \Delta V_1 + \Delta V_2$$
$$= I_1 R_1 + I_2 R_2$$
$$= I R_1 + I R_2$$

$$\Delta V = R_{eq} \cdot I$$

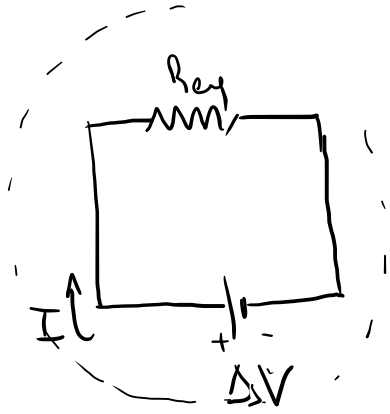
$$R_{eq} \cdot \cancel{I} = \cancel{I} \cdot R_1 + \cancel{I} R_2$$

$$R_{eq} = R_1 + R_2 + \dots\dots + R_n$$



$\Delta V_{ac} = \Delta V_{bc}$

$= \Delta V$



$I = \frac{\Delta V}{R_{eq}}$

$\Delta V = \Delta V_1 = \Delta V_2$

$I = I_1 + I_2$

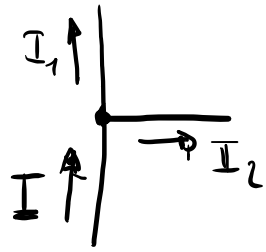
$\frac{\Delta V}{R_{eq_1}}$ $\quad \frac{\Delta V_1}{R_1}$ $\quad \frac{\Delta V_2}{R_2}$

$$\frac{\Delta V}{R_{eq}} = \frac{\Delta V_1}{R_1} + \frac{\Delta V_2}{R_2}$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$$

Leggi di Kirchhoff

- $\sum_{\text{nodo}} I = 0$



$I + I_1 + I_2 = 0$

- $\sum_{\text{maglia}} \Delta V = 0$