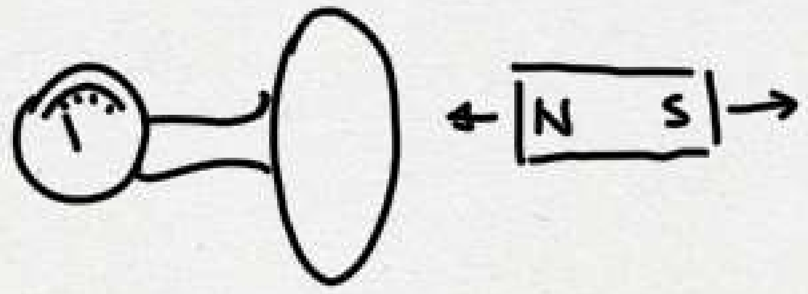
$q \longrightarrow \vec{E}$

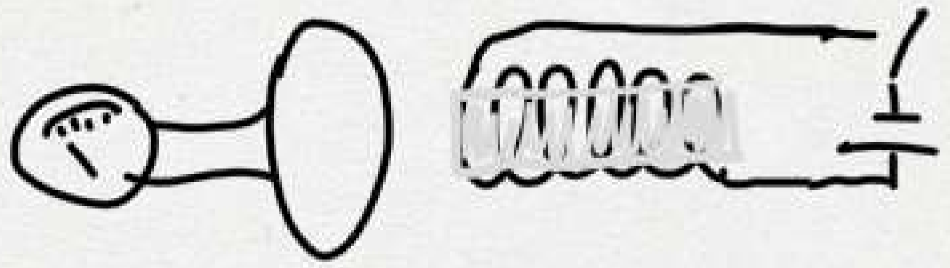
$i \longrightarrow \vec{B}$

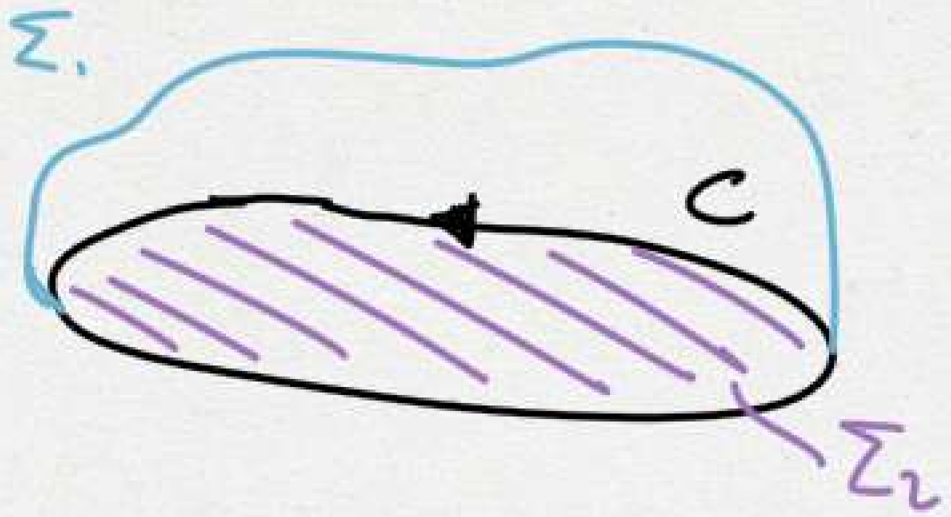
$\vec{E}(t) \longrightarrow \vec{B}(t)$

$\vec{B}(t) \longrightarrow \vec{E}(t)$



$i(t) \to B(t)$





$$\boxed{\oint_C \vec{E}\cdot d\vec{s} = -\frac{d\,\Phi_C(\vec{B})}{dt}}$$ LEGGE DI FARADAY

$$\Phi_{\Sigma_1}(\vec{B}) = \Phi_{\Sigma_2}(\vec{B}) \equiv \Phi_C(\vec{B})$$ PERCHÉ $\vec{B}$ È SOLENOIDALE

$$\oint_C \vec{E}\cdot d\vec{s} = \mathcal{E}$$ F.E.M.

C NON DEVE NECESSARIAMENTE ESSERE UN CIRCUITO

SE C COINCIDE CON UN CONDUTTORE DI RESISTENZA R, ALLORA

$$i = \frac{\mathcal{E}}{R}$$

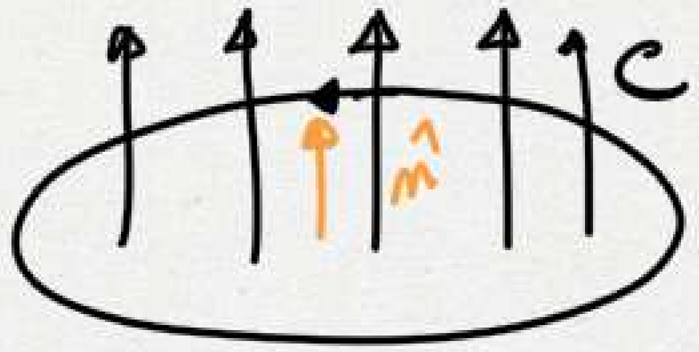
$$\mathcal{E}_i = - \frac{d}{dt}\Phi_c(\vec{B})$$

↳ LEGGE DI LENZ

se $\Phi(\vec{B})$ AUMENTA NEL $t \longrightarrow \mathcal{E}_i < 0$

se $\Phi(\vec{B})$ DIMINUISCE NEL $t \longrightarrow \mathcal{E}_i > 0$

$\vec{B}(t) \parallel \hat{n}$



c coincide con una spira

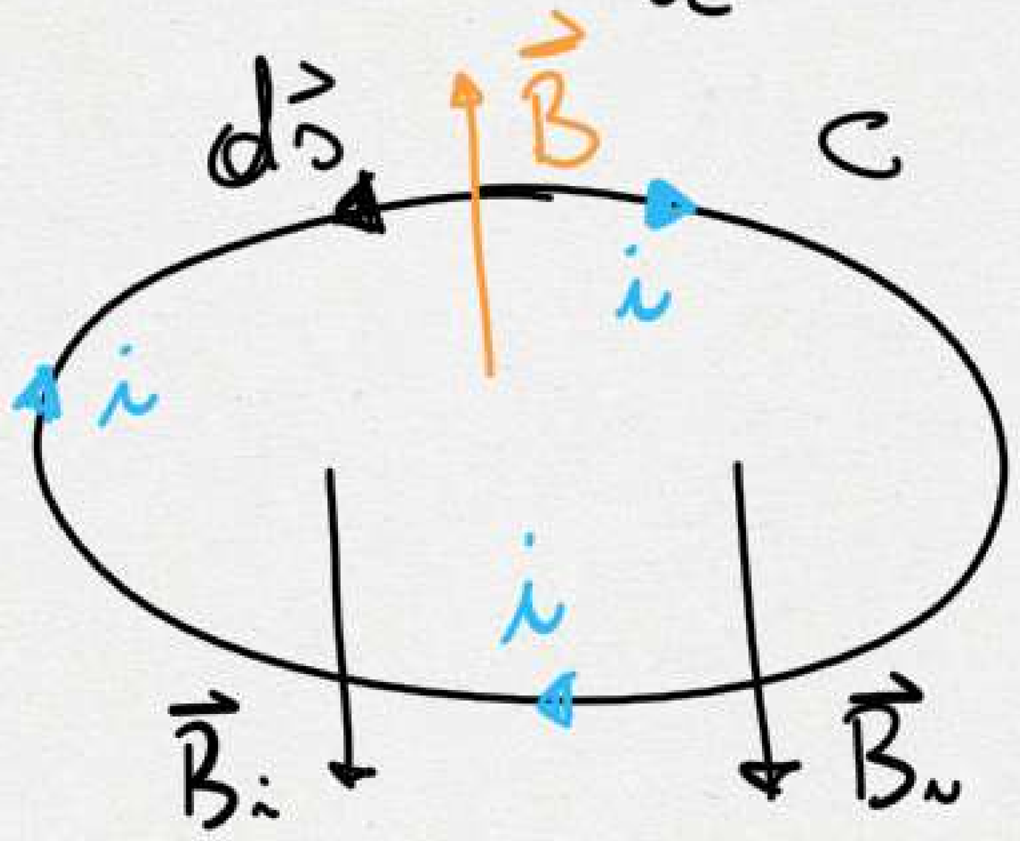
$$\int_c \vec{B}\cdot\hat{n}\, d\Sigma = \Sigma B(t) > 0$$

se $B(t)$ aumenta $\rightarrow \mathcal{E}_i < 0 \longrightarrow i$ scorre in verso "contrario" a $\hat{n}$

se $B(t)$ diminuisce $\rightarrow \mathcal{E}_i > 0 \longrightarrow i$ ha verso coerente con $\hat{n}$

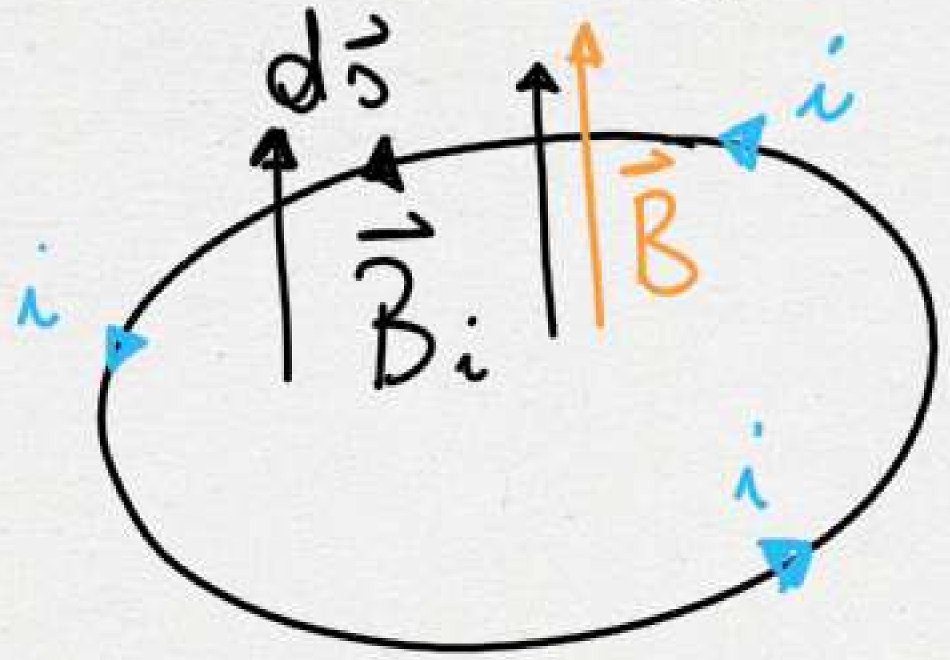
$B(t)$ AUMENTA

$\mathcal{E}_i < 0 \Rightarrow \oint_C \vec{E} \cdot d\vec{s} < 0$

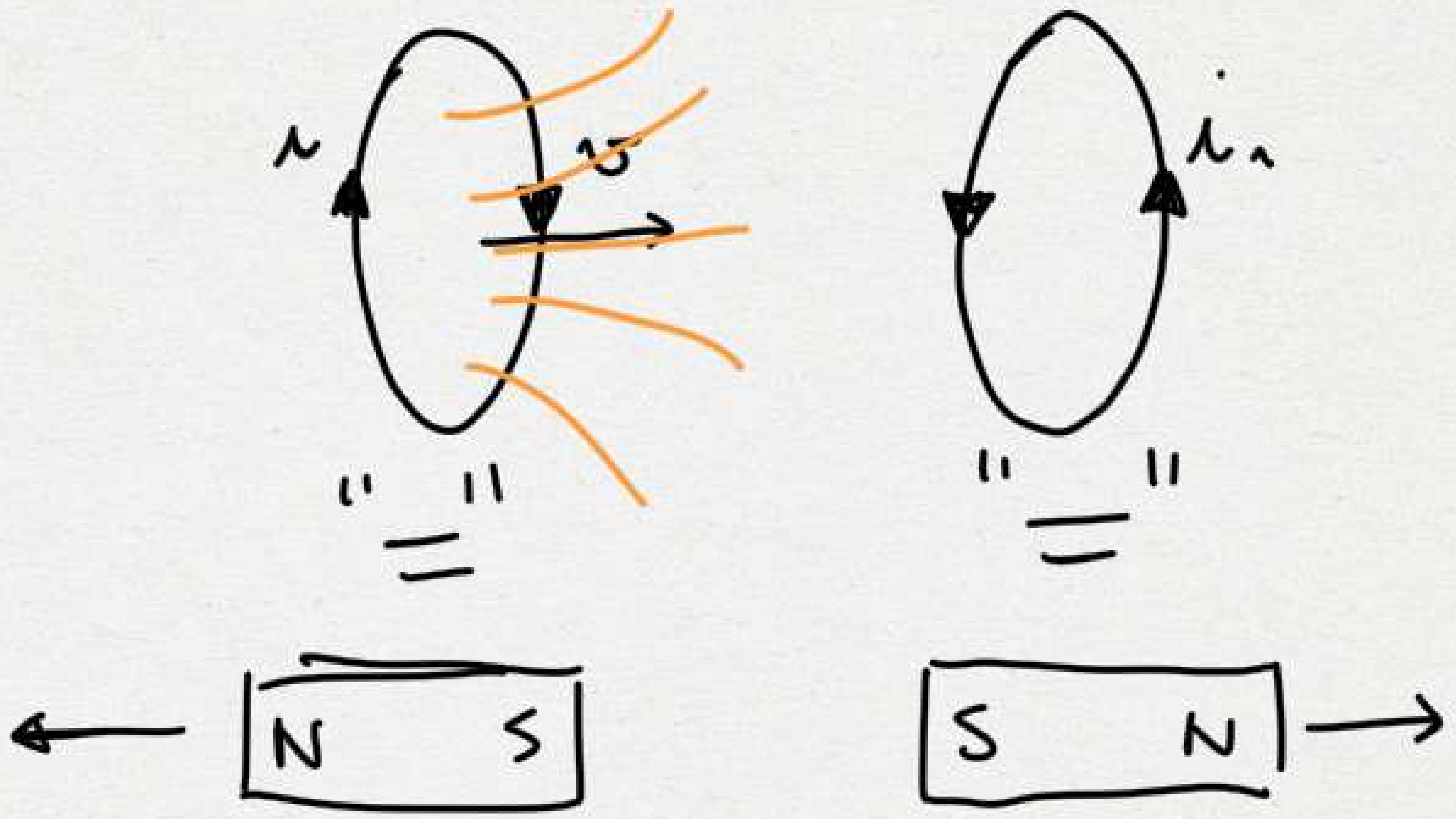


$B(t)$ DIMINUISE

$\mathcal{E}_i > 0 \Rightarrow \oint_C \vec{E} \cdot d\vec{s} > 0$

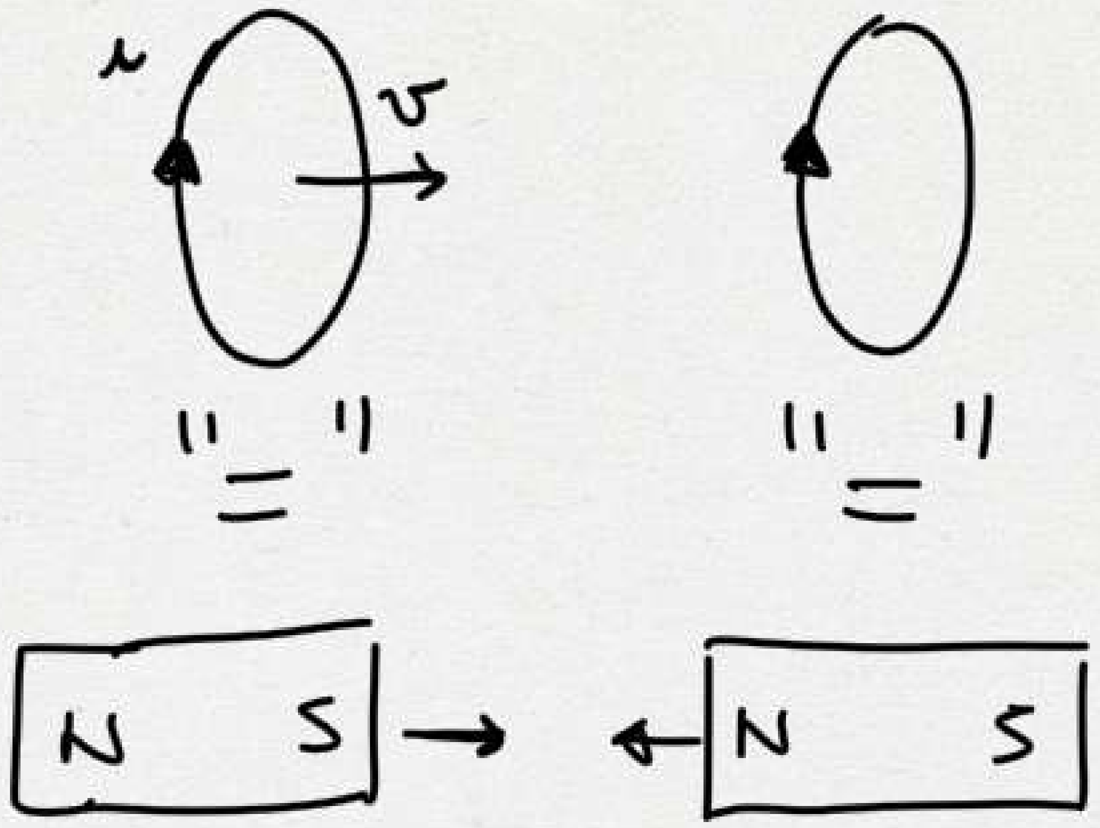


L'INDUZIONE ELETTROMAGNETICA RESISTE AL CAMBIAMENTO



LEGGE DI LENZ

PER ASSURDO



IMPOSSIBILE PER LA CONSERVAZIONE DELL'ENERGIA

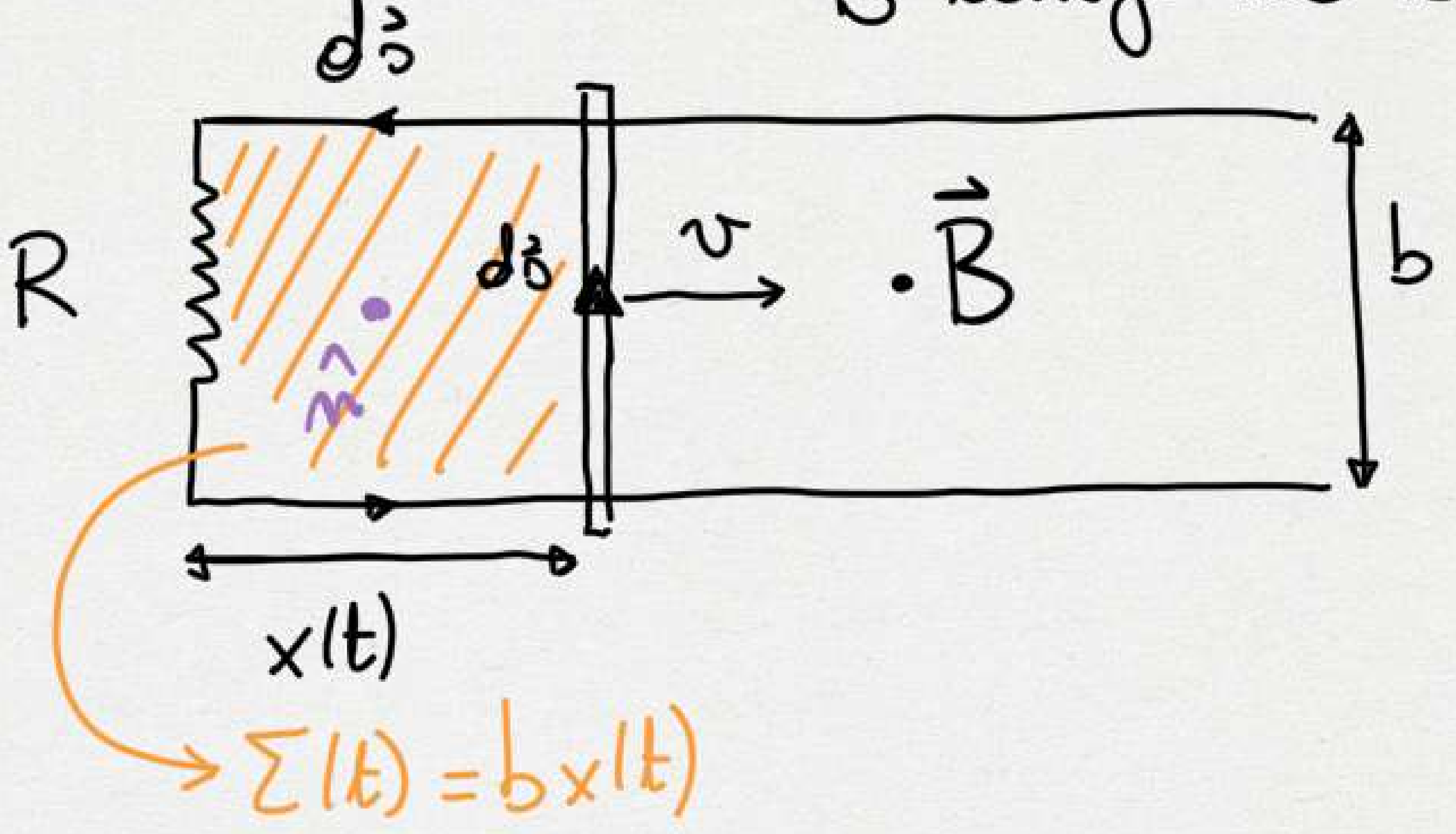
$$\oint_{C(t)} \vec{E}\cdot d\vec{s} = -\frac{d}{dt}\int_{\Sigma_c(t)} \vec{B}\cdot\hat{n}\, d\Sigma$$

① cambia $\vec{B}$

② cambia $\Sigma_c(t)$

STUDIAMO ②

$\vec{B}$ uniforme e uscente

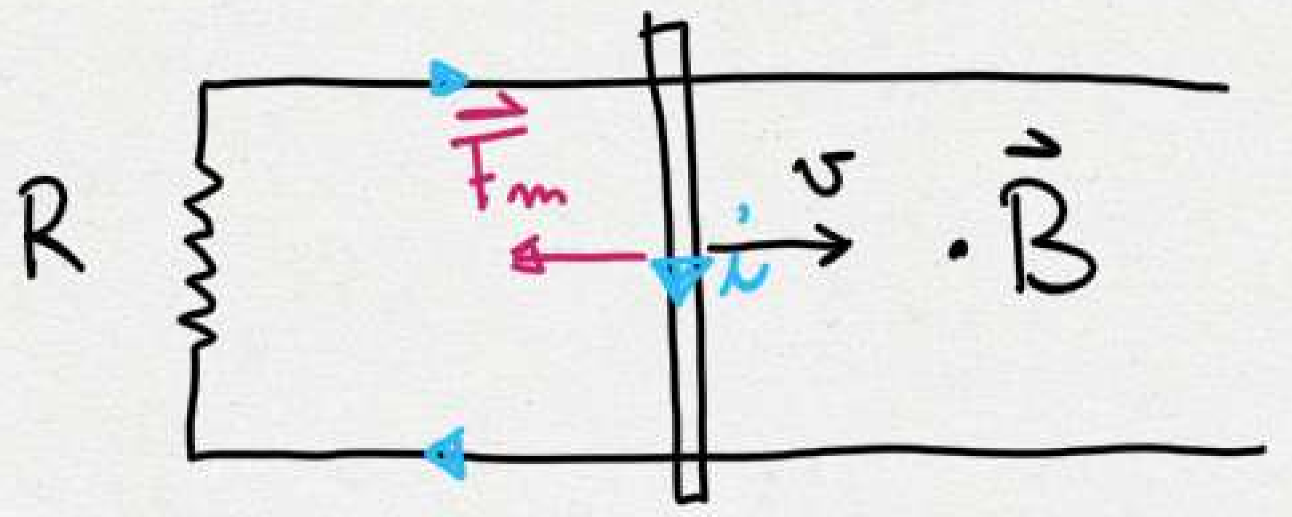


$\vec{F}_L = -e\vec{v}\times\vec{B}$, $\vec{E} = \frac{\vec{F}}{q} = \vec{v}\times\vec{B}$ CAMPO ELETTROMOTORE

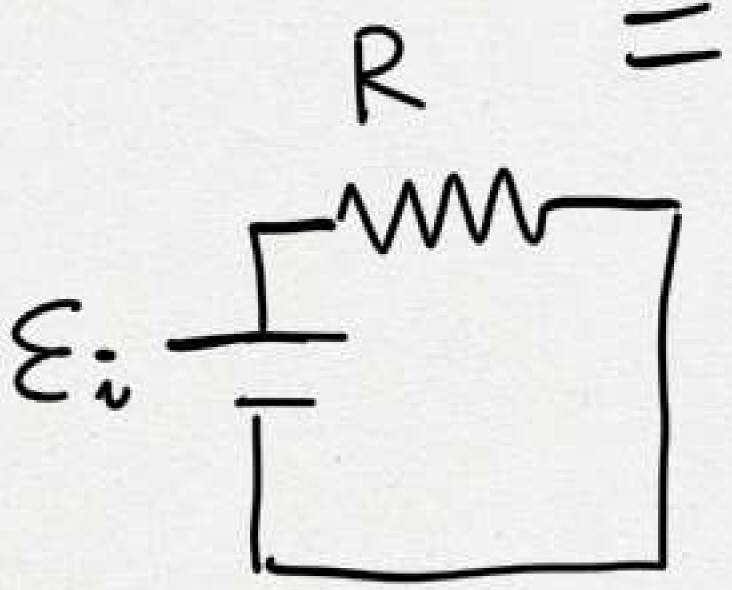
$$\oint_c \vec{E}\cdot d\vec{s} = \int_0^b (\vec{v}\times\vec{B})\cdot d\vec{s} = \int_0^b (-vB)\,ds = -vBb = \mathcal{E}_i$$

$$\Phi_{\Sigma(t)}(\vec{B}) = \int_{\Sigma_c(t)} \vec{B}\cdot\hat{n}\, d\Sigma = \int_{\Sigma_c(t)} B\, d\Sigma = B\,\Sigma(t) = B\,b\,x(t)$$

$$\Rightarrow -\frac{d\Phi_\Sigma(\vec{B})}{dt} = -Bbv = \mathcal{E}_i$$



" = "



$$\mathcal{E}_i = - Bbv$$

$$i = \frac{|\mathcal{E}_i|}{R} = \frac{Bbv}{R}$$

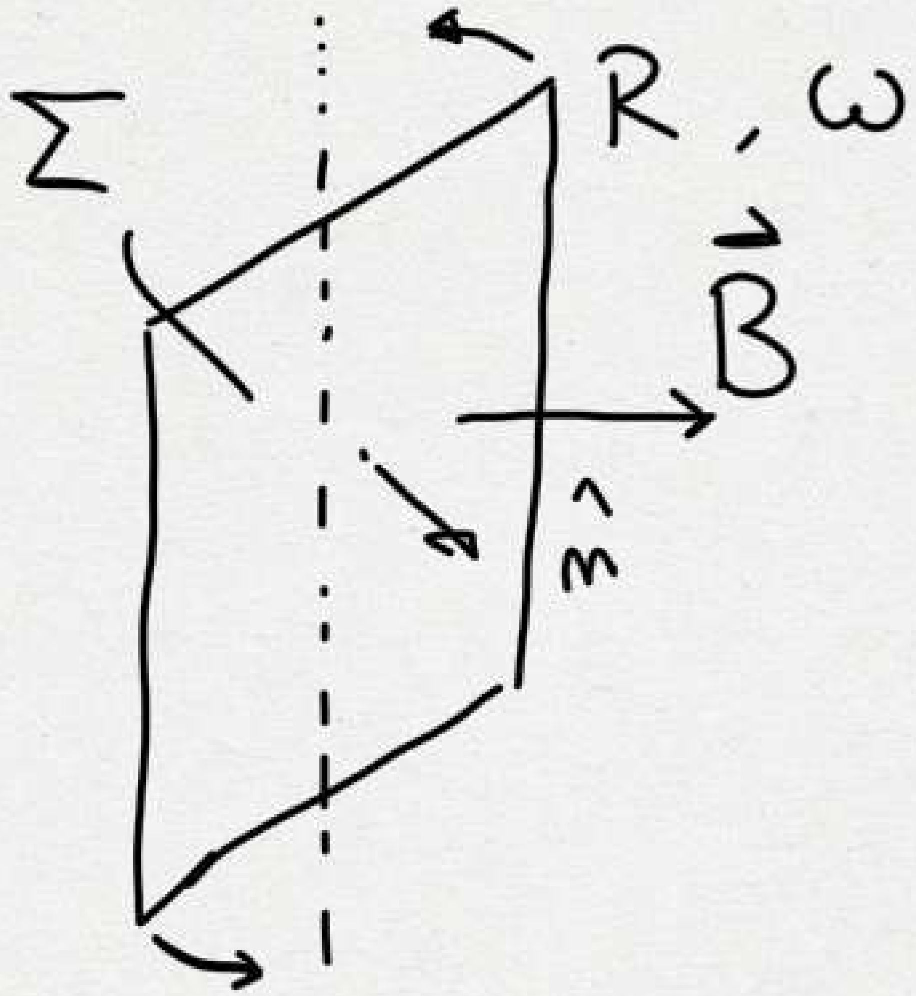
$$\vec{F}_m = i\vec{b} \times \vec{B} = -ibB\,\hat{x} = -\frac{B^2b^2v}{R}\,\hat{x} = -\frac{B^2b^2\vec{v}}{R}$$

ATTRITO ELETTROMAGNETICO ← LEGGE DI LENZ

$$\vec{F}_{ext} = -\vec{F}_m$$

$$P = \frac{dW}{dt} = \frac{F_{ext}\,ds}{dt} = \frac{F_{ext}\,v\,dt}{dt} = F_{ext}\,v = \frac{B^2b^2v^2}{R} = \mathcal{E}_i\, i$$

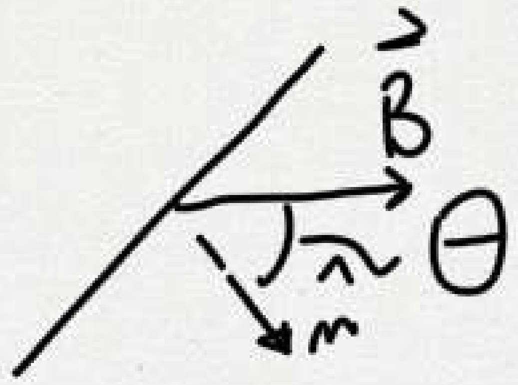
POTENZA DEL GENERATORE



$$\Phi_\Sigma(\vec{B}) = B\Sigma\cos\theta = B\Sigma\cos\omega t \Rightarrow$$

$$\mathcal{E}_i = -\frac{d\Phi}{dt} = B\Sigma\omega\sin\omega t \Rightarrow$$

$$\boxed{i = \frac{\mathcal{E}_i}{R} = \frac{B\Sigma\omega\sin\omega t}{R}}$$



ALTERNATORI

95% DI EFFICIENZA