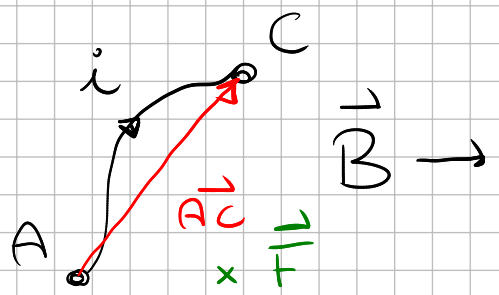
MOMENTI MECCANICI SU CIRCUITI



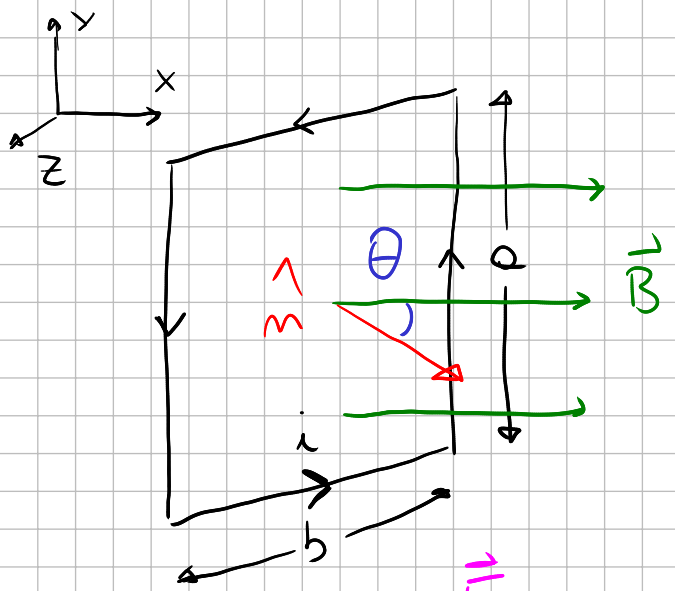
se $\vec{B}$ è uniforme, $\vec{F} = i\,\vec{AC} \times \vec{B}$ forza applicata nel filo

$\vec{F} \perp \vec{AC}$, $\vec{F} \perp \vec{B}$

• = VETTORE USCENTE

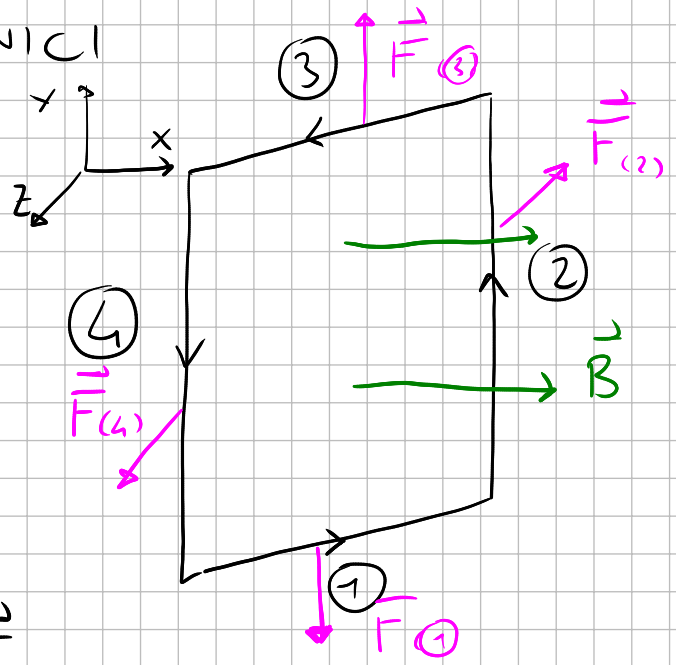
× = VETTORE ENTRANTE

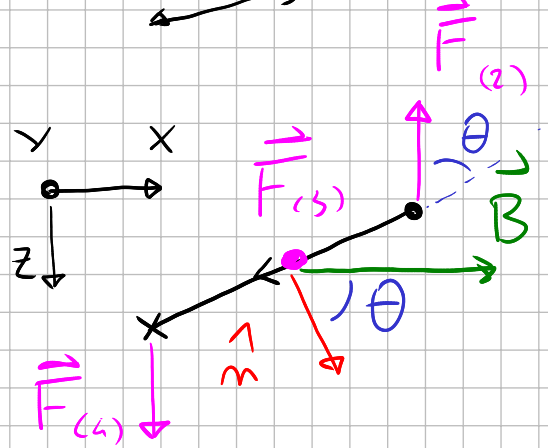
MOMENTI MECCANICI



$$\vec{B} \cdot \hat{n} = B \cos\theta$$

$$\vec{F} = i \vec{AC} \times \vec{B}$$





$$\vec{F}_{(1)} = \vec{F}_{(3)}, \quad \vec{F}_{(1)} = -\vec{F}_{(3)}$$

$$F_{(2)} = i a B = F_{(4)}$$

$$|\vec{M}| = |\vec{r} \times \vec{F}_{(2)}| = r F_{(2)} \sin\theta = \underbrace{b}_{\Sigma} i a B \sin\theta =$$

$$= i \Sigma \underbrace{B \sin\theta}_{|\hat{n} \times \vec{B}|} = \left| \underbrace{i \Sigma \hat{n}}_{\vec{m}} \times \vec{B} \right| = |\vec{m} \times \vec{B}|$$

$\vec{m}$ momento di dipolo magnetico del circuito

RECAP

$$|\vec{M}| = |\vec{m} \times \vec{B}| \rightarrow \vec{M} = \vec{m} \times \vec{B}$$

$$U_e = -\vec{m} \cdot \vec{B}$$

$$[m] = A\,m^2 = \frac{J}{T}$$

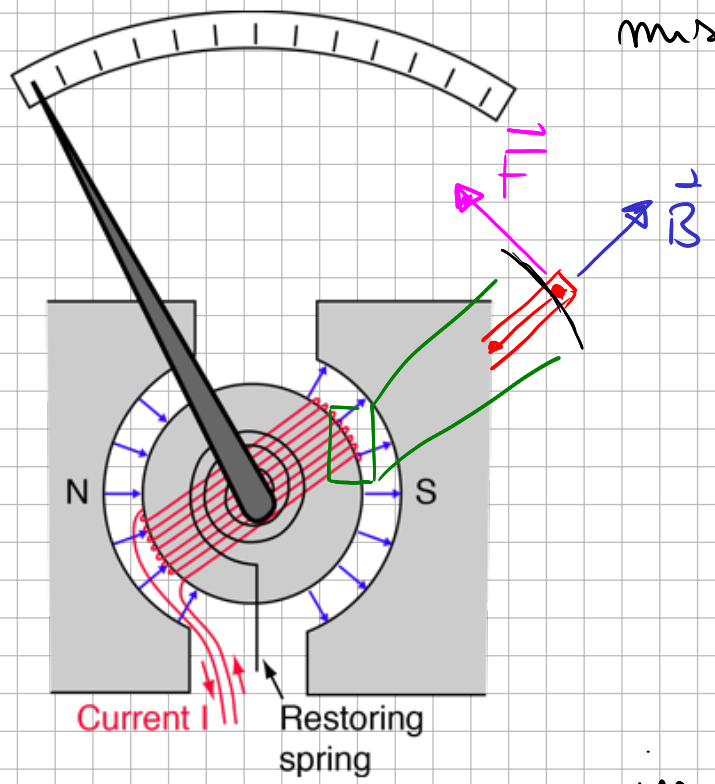
DIPOLO ELETTRICO

$$\vec{M} = \vec{p} \times \vec{E}$$

$$U_e = -\vec{p} \cdot \vec{E}$$

ESEMPIO: GALVANOMETRO

misura la corrente



$\vec{F}$

$\vec{B}$

$M_s = i \Sigma B$ momento meccanico su una singola spira

$M_M = N M_s$ momento meccanico totale, N numero di spire

$M_E = k\theta$ costante della molla angolare

in equilibrio, $M_E = M_M \Rightarrow i \Sigma B N = k\theta \Rightarrow$

$$\boxed{i = \frac{k\theta}{\Sigma B N}}$$