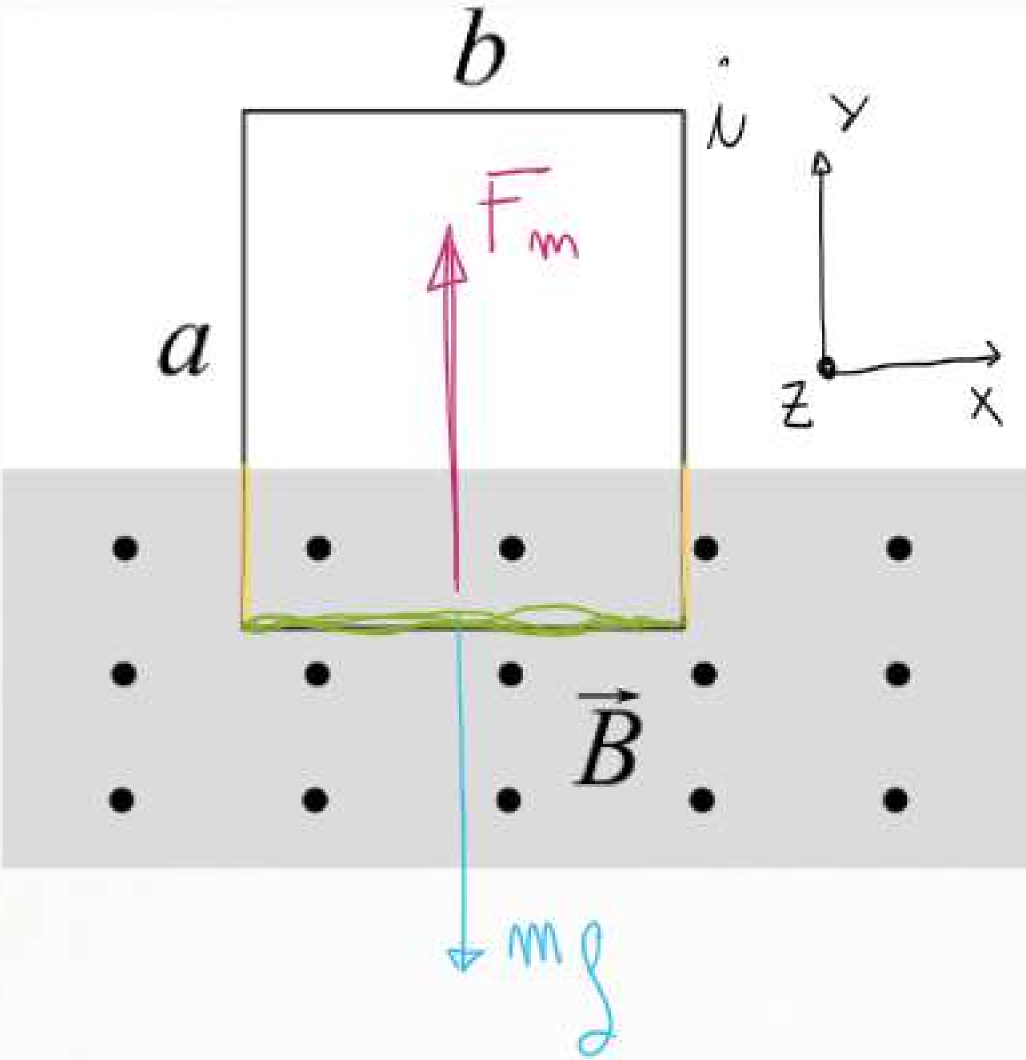


$$\bar{F}_m = i b B = m g \Rightarrow$$

$$B = \frac{mg}{ib}$$

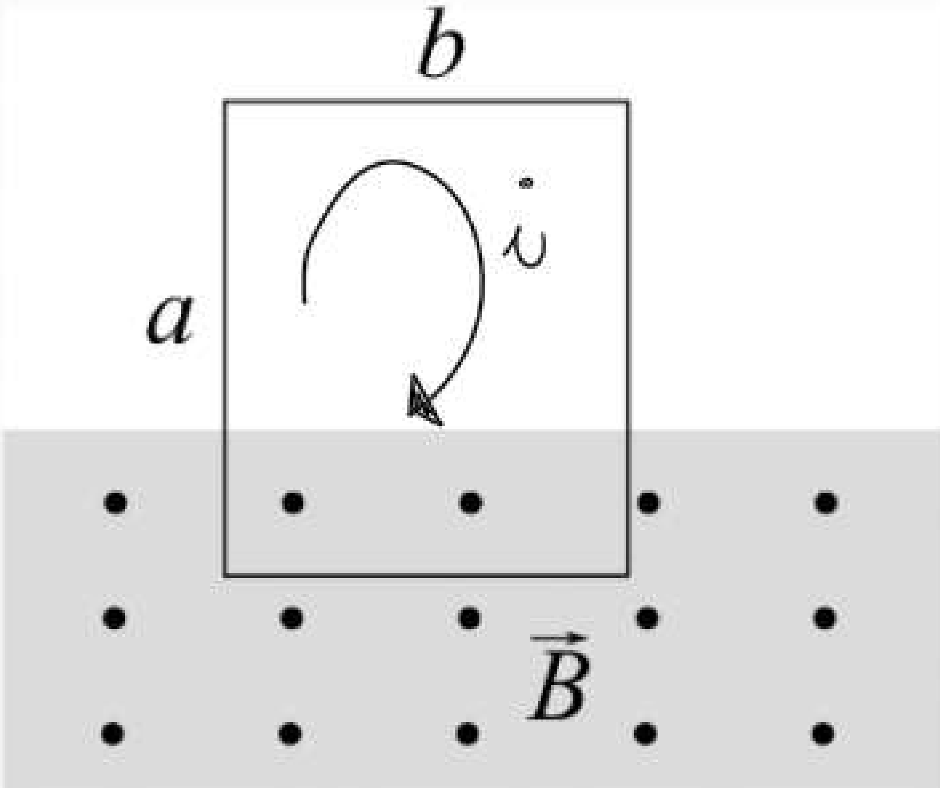
$$\vec{F}_m \parallel \hat{y}, \quad \vec{B} \parallel \hat{z} \Rightarrow$$

$$\vec{F}_m = i \vec{\ell} \times \vec{B}$$

$$F_m \hat{y} = i \vec{\ell} \times (B \hat{z}) \Rightarrow$$

$$\hat{y} = -\hat{x} \times \hat{z} \Rightarrow \vec{\ell} \parallel -\hat{x}$$

PRIMO METODO



$$\vec{F}_m = i\,\vec{l}\times\vec{B}$$

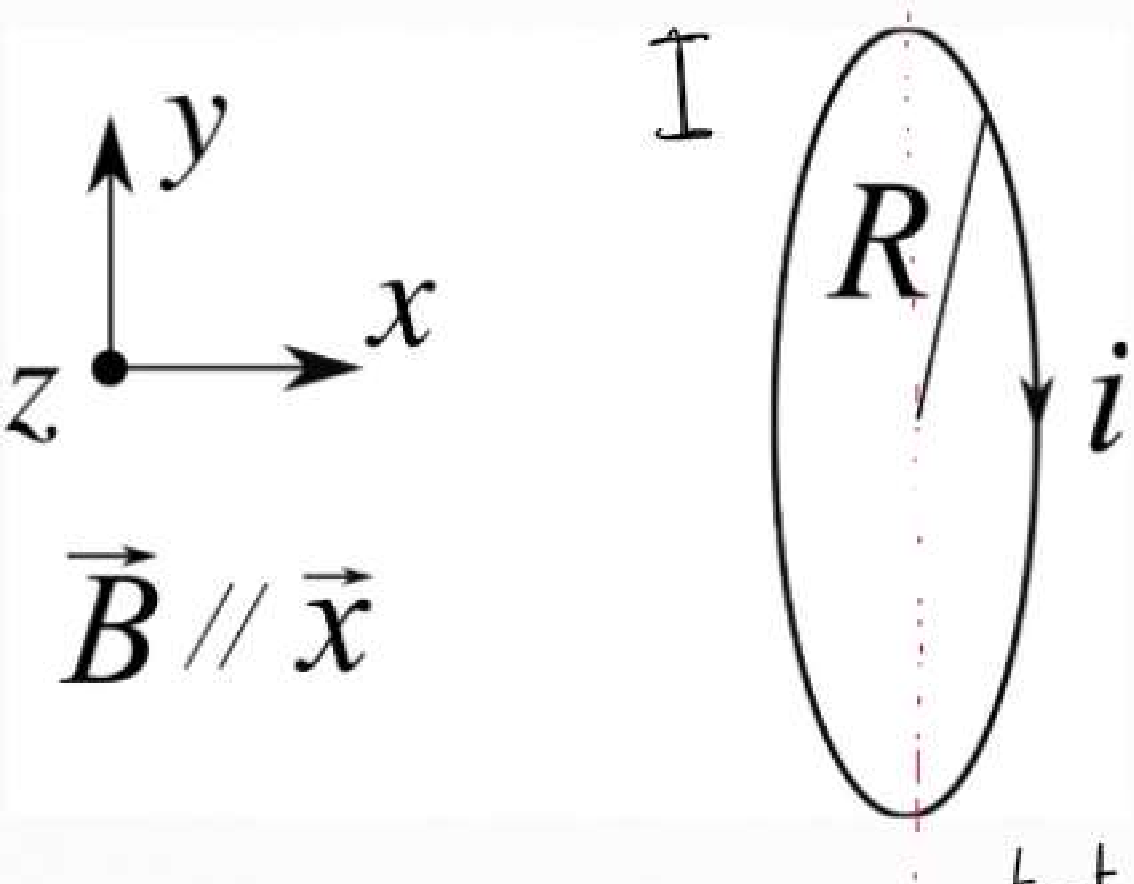
IPOTIZZIAMO CHE $\vec{l} \parallel \hat{x}$

$$i\vec{l}\times\vec{B} = ib\,\hat{x}\times(B\hat{z}) =$$

$$= ibB\,(\hat{x}\times\hat{z}) = ibB(-\hat{y})$$

$$\Downarrow$$

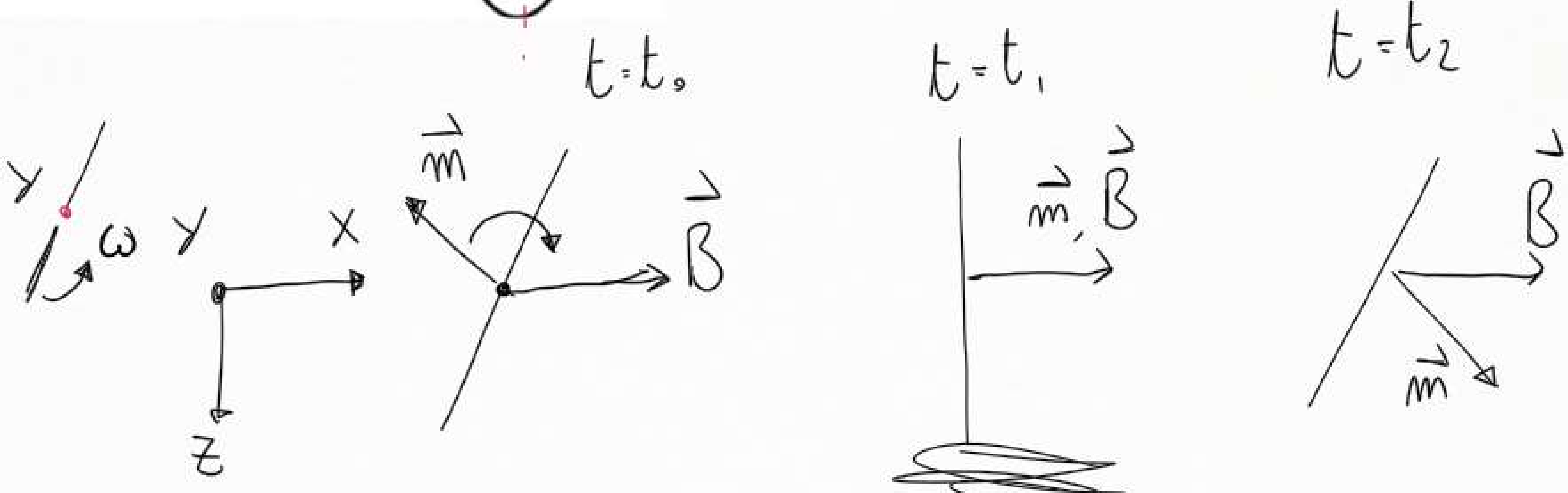
$$\vec{l} \parallel -\hat{x}$$

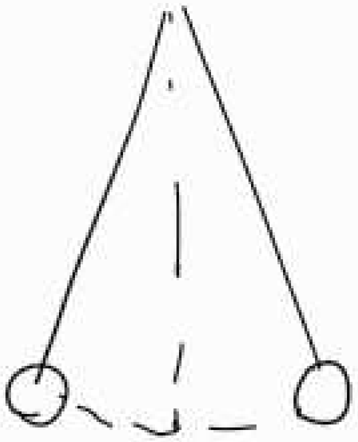


$\vec{B} = B_0 \hat{x}$

1) la vel. ang. massima è ω_0.
Calcolare $\theta : \omega = \frac{\omega_0}{3}$

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





$$U = U_r + U_e = \text{cost} \quad , \quad U_e = -\vec{m}\cdot\vec{B} \quad , \quad \Sigma = \pi R^2$$

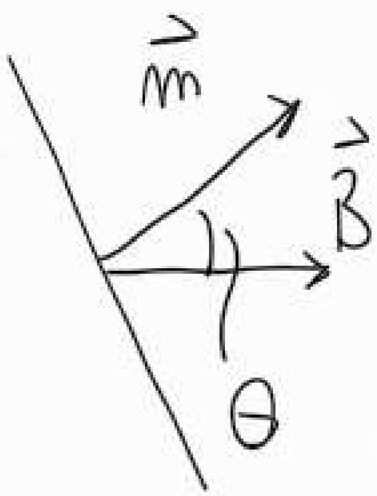
1

$$U^{(1)} = \frac{1}{2} I \omega_0^2 - m B_0 = \frac{1}{2} \omega_0^2 - \Sigma i B_0$$

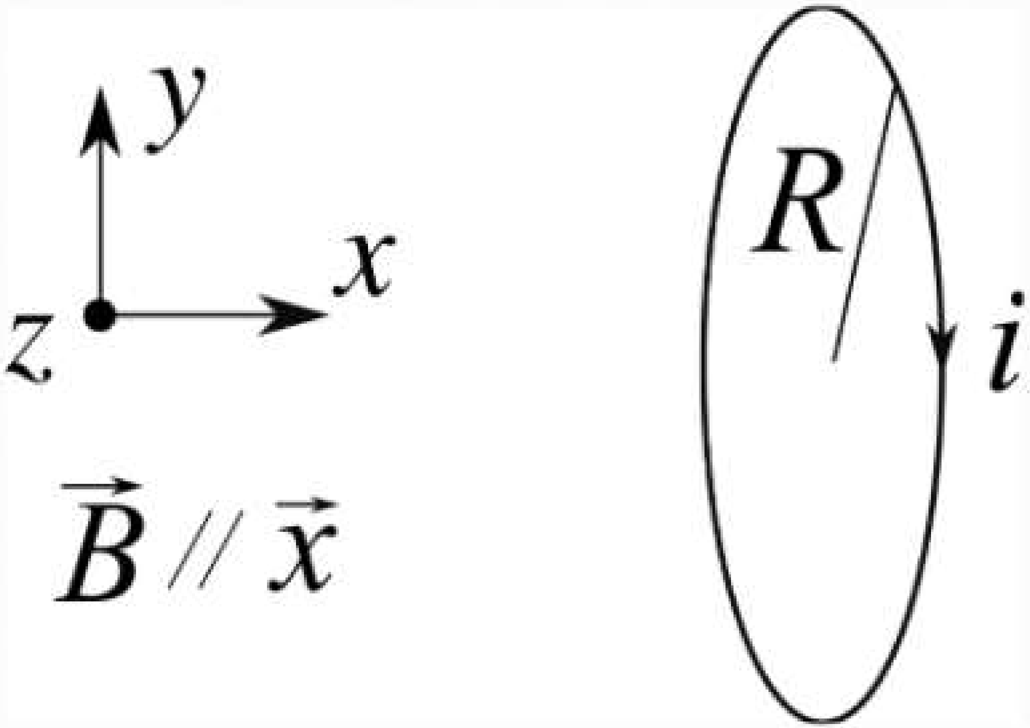
$$U^{(2)} = \frac{1}{2} I \left(\frac{\omega_0}{3}\right)^2 - \vec{m}\cdot\vec{B} = \frac{1}{2}\frac{1}{9} I \omega_0^2 - m B \cos\theta$$

$$U^{(1)} = U^{(2)} = \frac{1}{18} I \omega_0^2 - m B \cos\theta \Longleftrightarrow$$

2



$$\cos\theta = \left[\frac{1}{18} I \omega_0^2 - U^{(1)}\right] \frac{1}{mB}$$



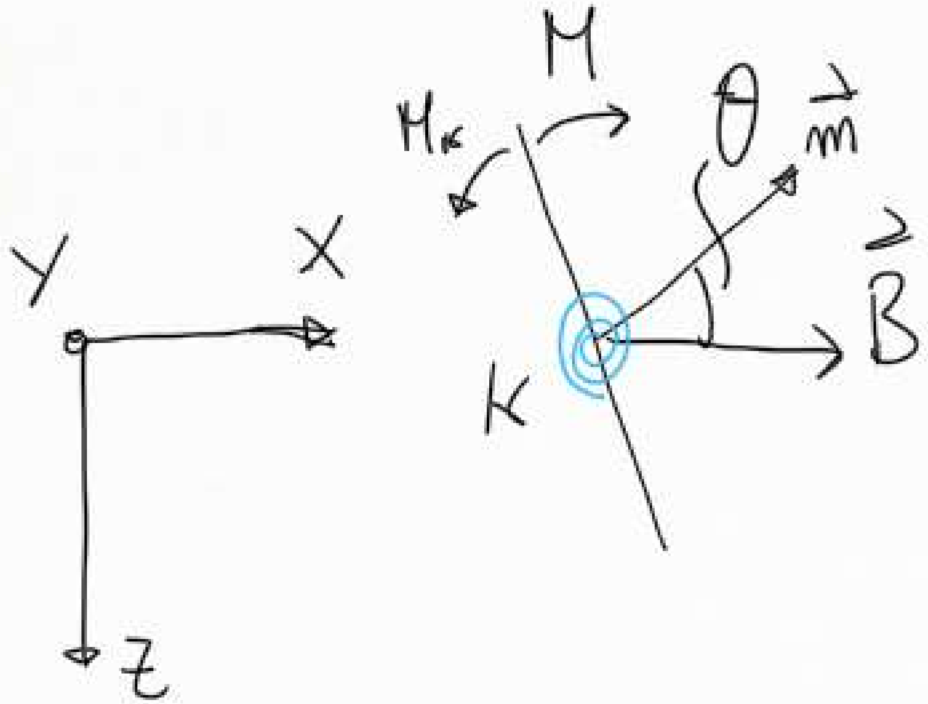
1) quando $\omega = 0$, viene collegata la molla

$$M = M_k = k\theta,$$

$$\vec{M} = \vec{m} \times \vec{B} \Rightarrow M = mB\sin\theta \Rightarrow$$

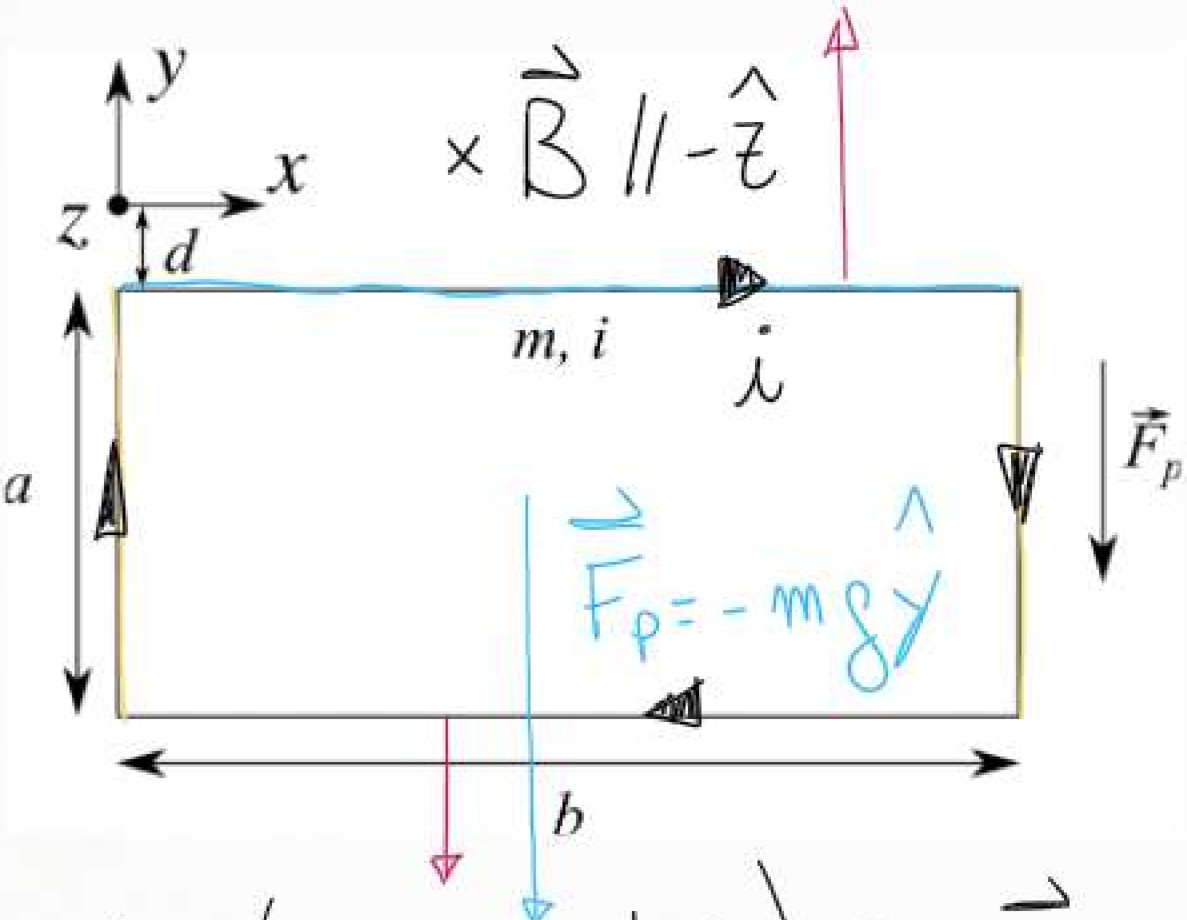
$$mB\sin\theta = k\theta \Rightarrow$$

$$k = \frac{mB\sin\theta}{\theta}$$



$$U^{(1)} = -\vec{m}\cdot\vec{B} = -mB\cos\theta \Rightarrow$$

$$\boxed{\cos\theta = -\frac{U^{(1)}}{mB}} \rightarrow \theta$$



$a = 40$ cm, $b = 1$ m, $m = 1$ g

$B(y) = \left|\frac{A}{y}\right|$, $A = 6 \cdot 10^{-6}$ Tm

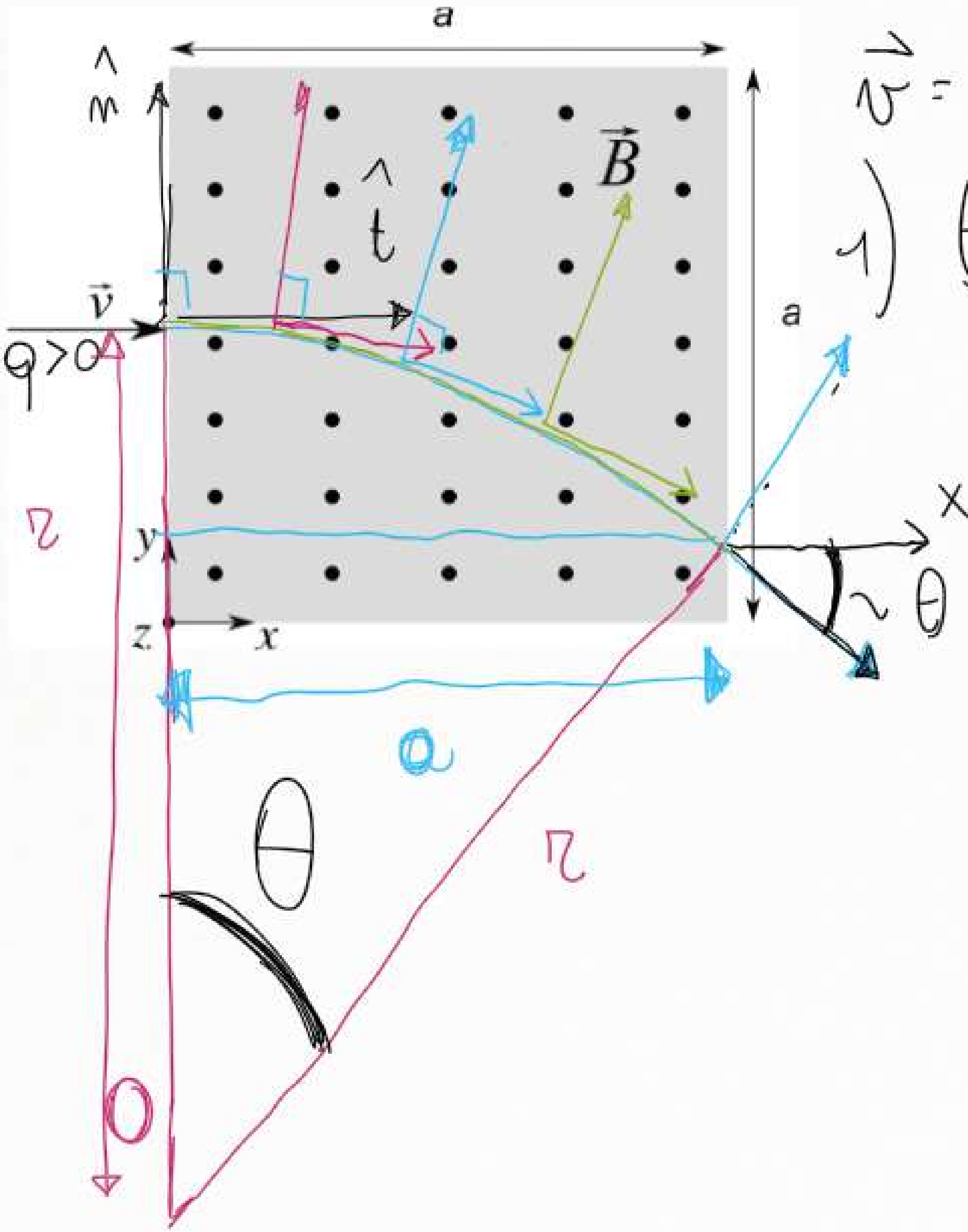
1) verso e intensità di i necessario per far rimanere la spira in equilibrio

2) $\vec{B}_{ADD} \parallel \hat{z}$, $B_{ADD} = 1$ T
UNIFORME

$$\vec{F}_m = \left(\frac{ibA}{d} - \frac{ibA}{d+a}\right)\hat{y} + \vec{F}_p = 0$$

$$\Downarrow$$

$$i\left(\frac{bA}{d} - \frac{bA}{d+a}\right) = mg$$



$\vec{v} = (v,0,0)$, $\vec{B} = (0,0,B)$

1) $\theta = ?$ (θ rispetto all'asse x), se

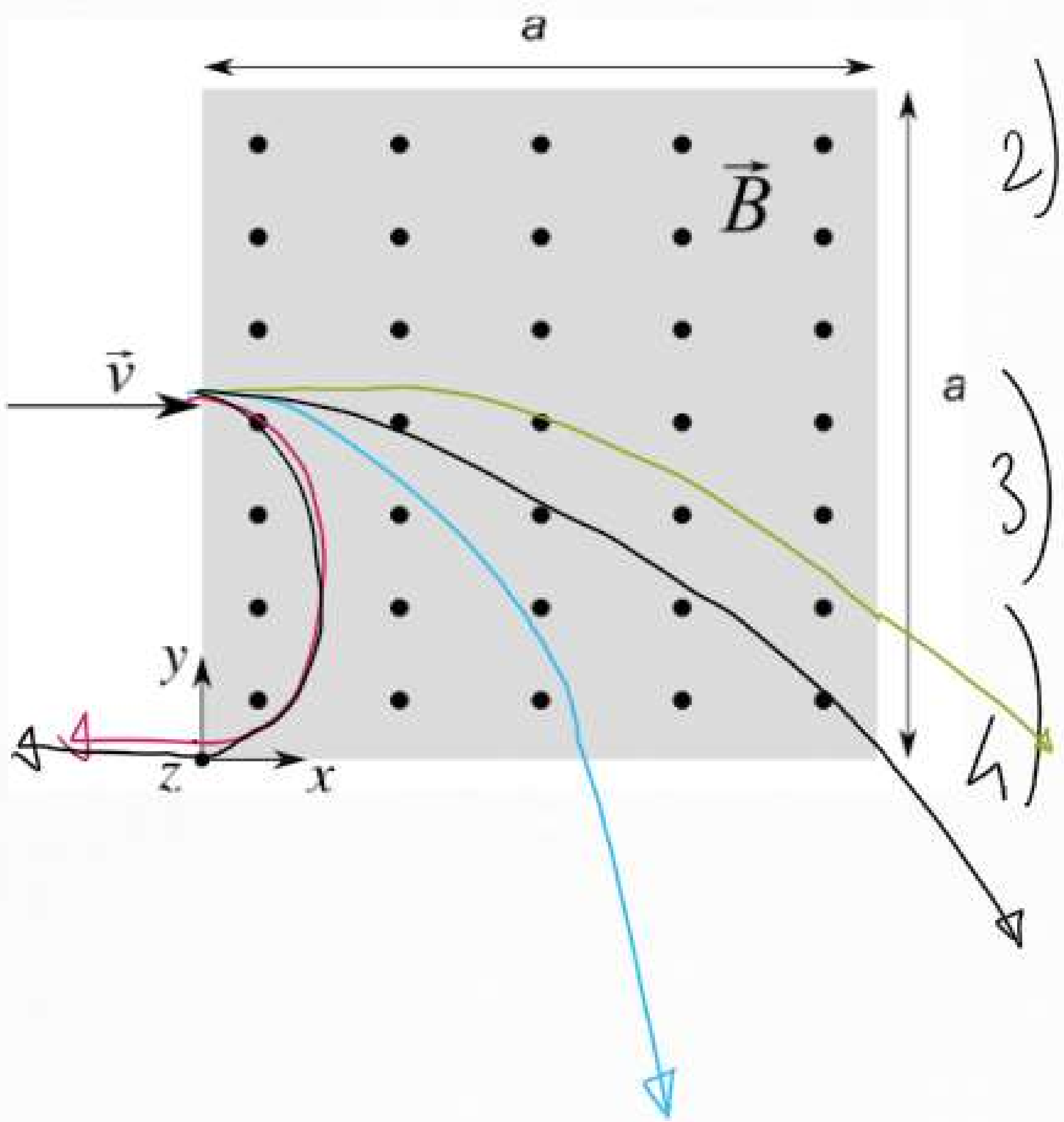
$$B = \frac{mv}{10qa}$$

$$r \sin\theta = a \implies$$

$$\sin\theta = \frac{a}{r}$$

$$\boxed{r = \frac{mv}{qB}} = 10a \implies$$

$$\sin\theta = \frac{1}{10}$$



2) per quali valori di B la part. esce dal lato in cui è entrata

3) " " alla sua destra

4) " " opposto a quello da cui è entrata