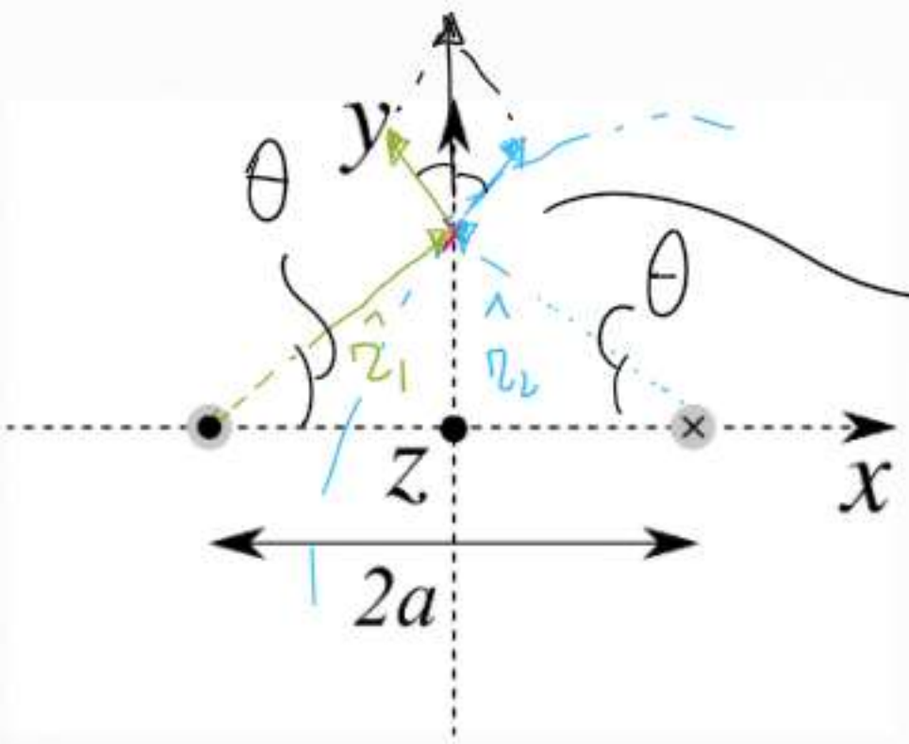
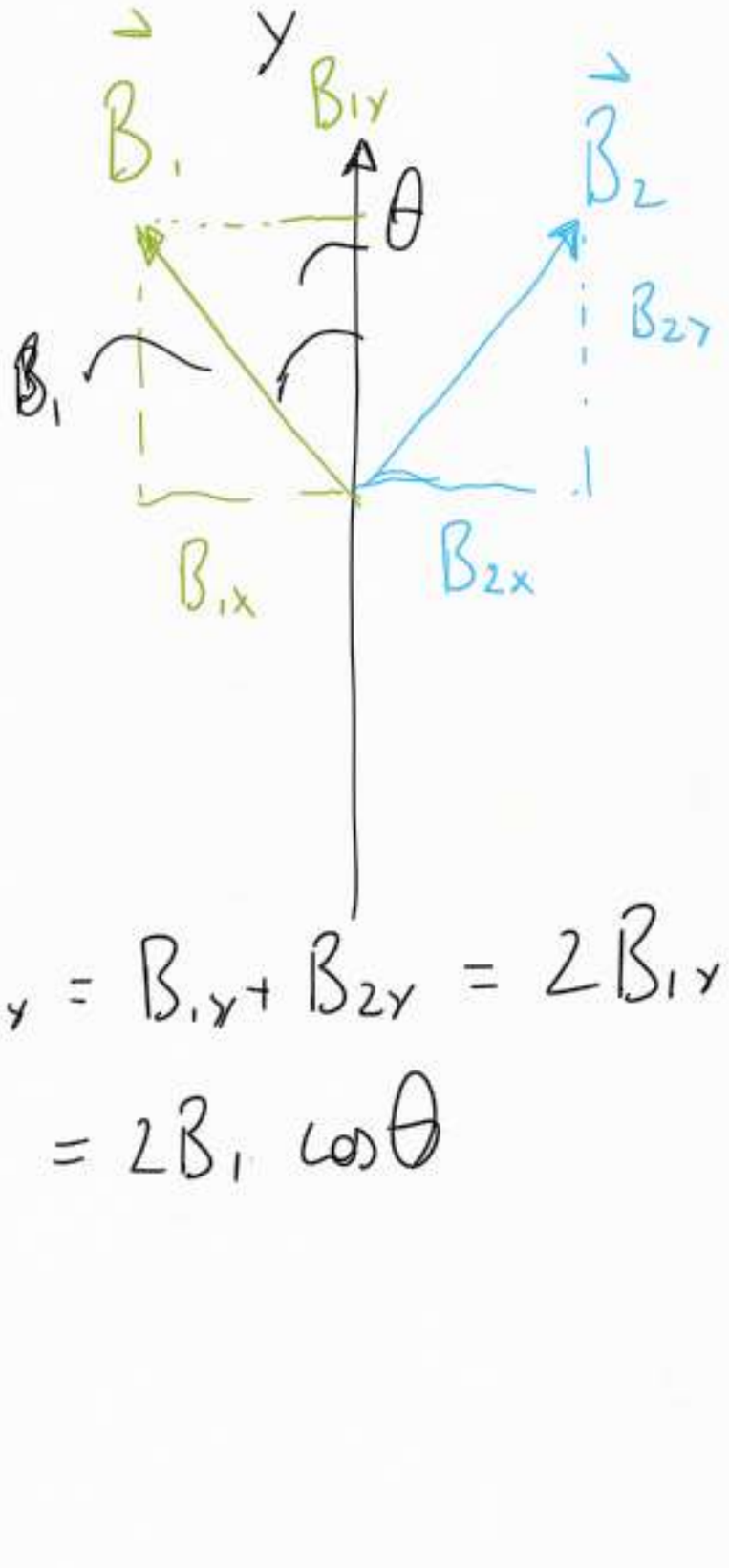
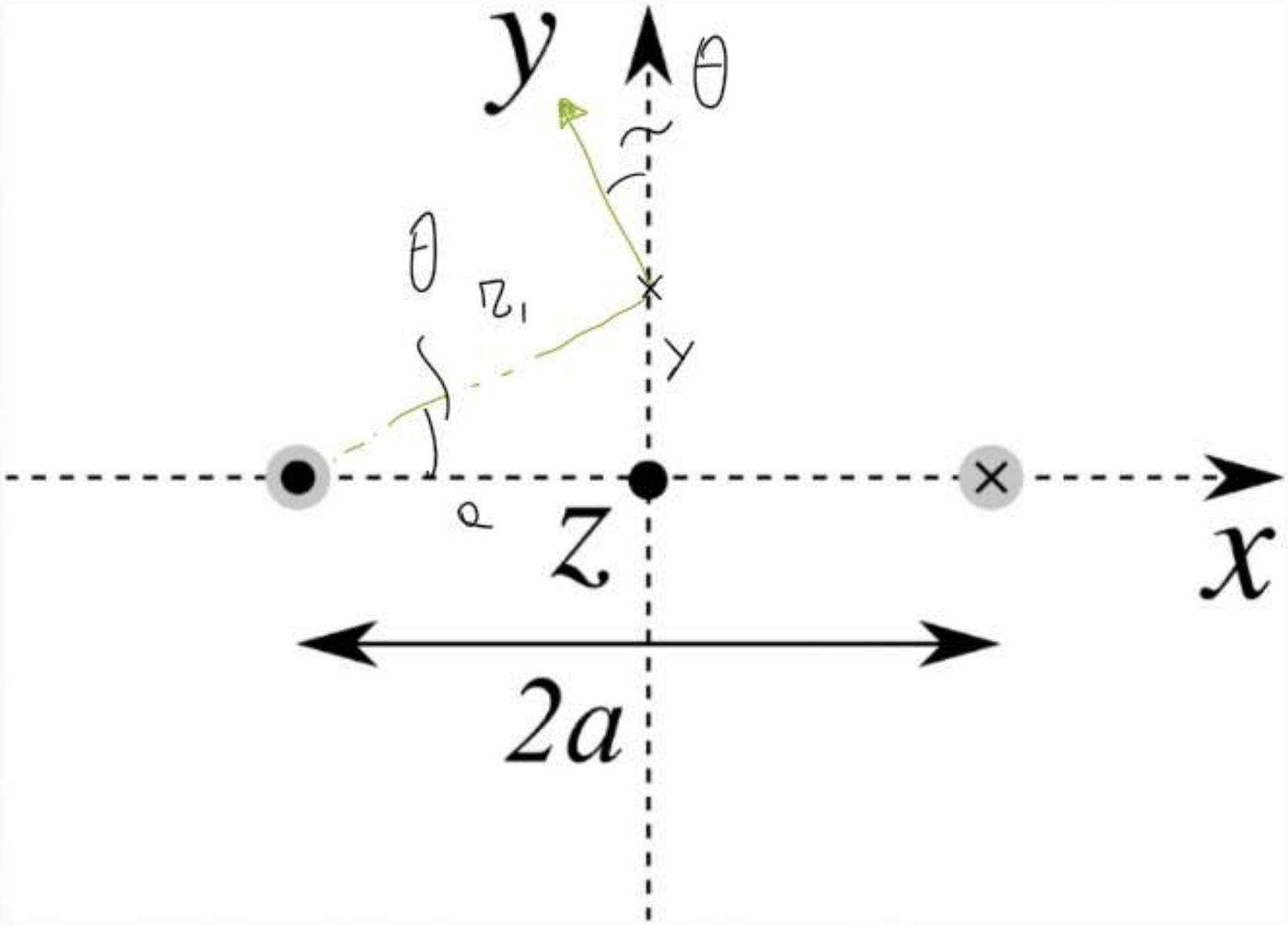




$$\vec{B}(x,0,0) = \frac{\mu_0 i \hat{x}}{2\pi}\left(\frac{1}{x+a} - \frac{1}{x-a}\right)$$

$$\vec{B}(0,y,0) = \frac{\mu_0 i}{\pi}\,\frac{a}{a^2+y^2}\,\hat{y}$$

$$B_y = B_{1y} + B_{2y} = 2B_{1y} = 2B_1\cos\theta$$



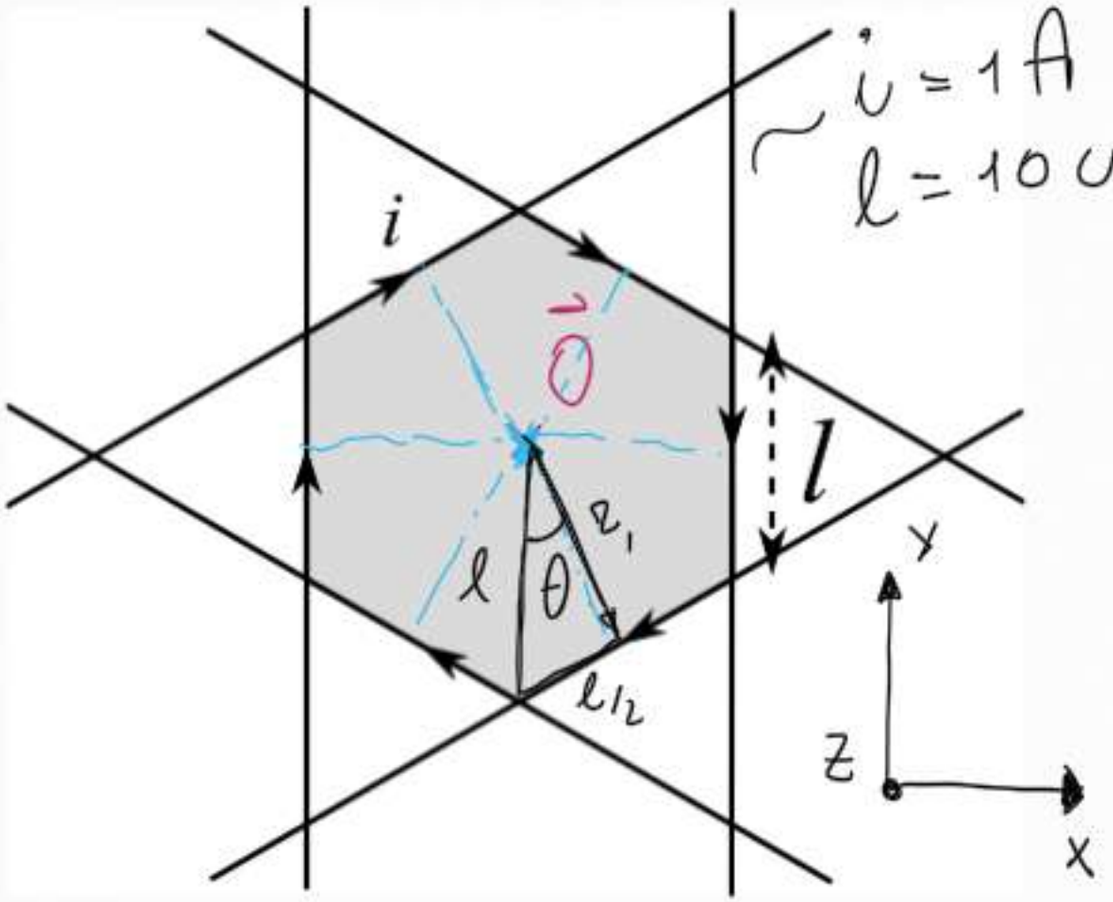
$$B_{1y} = B_1 \cos\theta = \frac{\mu_0 i}{2\pi r_1}\cos\theta$$

$$r_1 \cos\theta = \rho \Rightarrow$$

$$\cos\theta = \frac{\rho}{r_1} \Rightarrow$$

$$B_{1y} = \frac{\mu_0 i}{2\pi r_1}\frac{\rho}{r_1}$$

$$r_1 = \sqrt{\rho^2 + y^2}$$



$i = 1\,A$

$\ell = 10\,cm$

$B_z(\vec{0}) = ?$

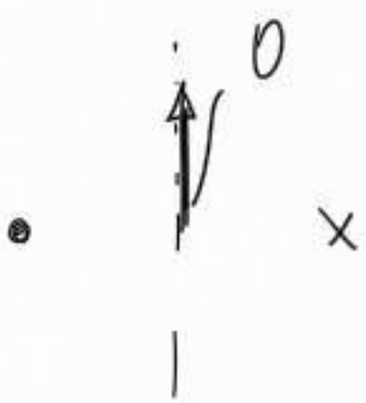
$\vec{B} = (0, 0, -B_0)$

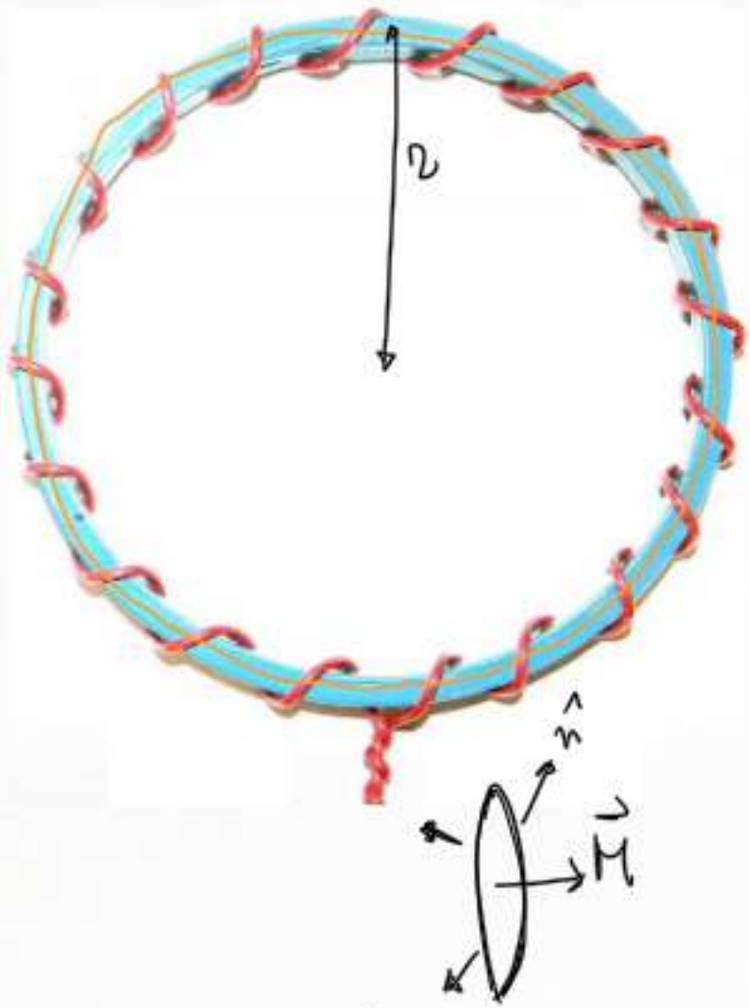
$B_0 = 6 B_1$

$B_1 = \frac{\mu_0 i}{2\pi r_1}$

$r_1 = \sqrt{\ell^2 - \frac{\ell^2}{4}}$

$r_1 = \frac{\ell}{2}\frac{1}{tg\theta} = \frac{\ell}{2}\frac{1}{tg\frac{\pi}{6}}$





N, i, K_m 1) $\vec{H}, \vec{B}, \vec{M}$ all'interno del solenoide
2) i_m

1) $\oint \vec{H} \cdot d\vec{s} = Ni$, $\oint \vec{H} \cdot d\vec{s} = H 2\pi r \Rightarrow$

$$H = \frac{Ni}{2\pi r}, \quad B = \mu H = \frac{\mu N i}{2\pi r}, \quad M = \chi_m H = \frac{\chi_m N i}{2\pi r}$$

$\chi_m = (K_m - 1)$ suscettività magnetica

2) $i_m = \oint \vec{M} \cdot d\vec{s} = M 2\pi r = \chi_m N i$

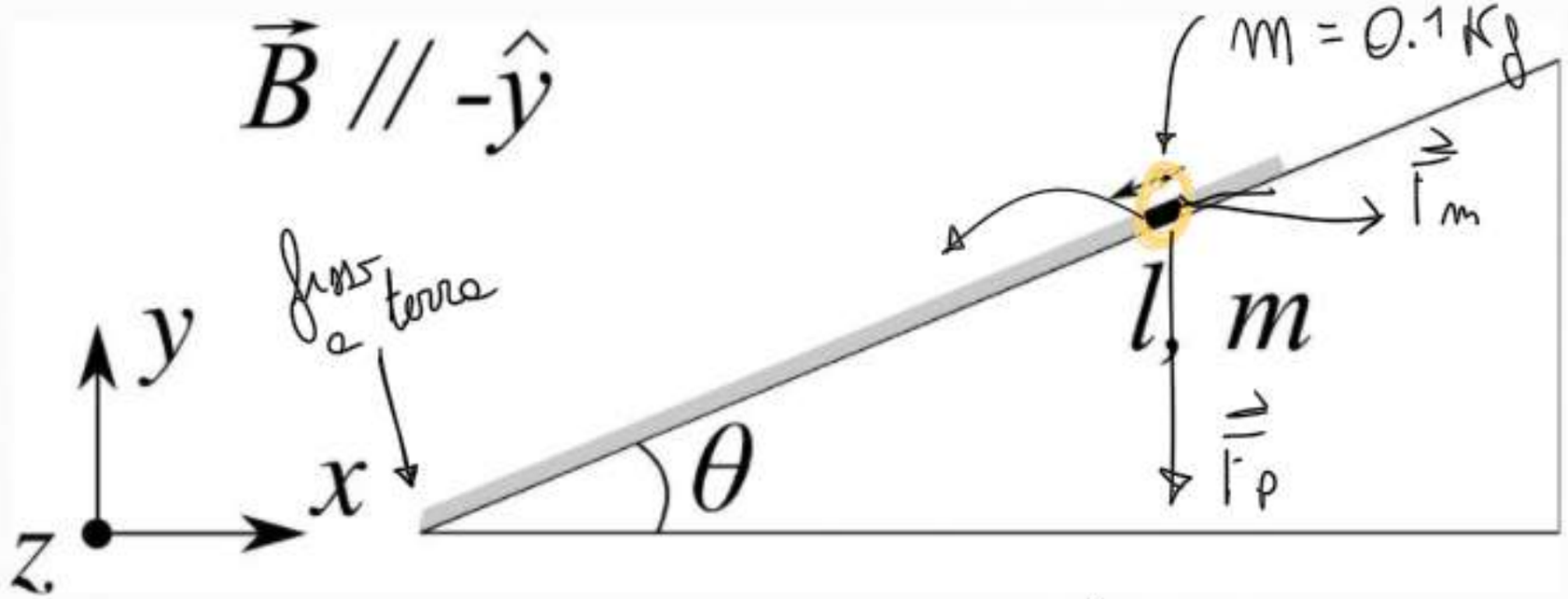
$\vec{J}_m = \vec{M} \times \hat{n} \Rightarrow J_m = M \Rightarrow i_m = J_m 2\pi r = 2\pi r M = \chi_m N i$

Solenoide lineare, $[n] = m^{-1}$

$$B = \mu_0 n i$$

Solenoide toroidale, $[N]$ = numero

$$B = \frac{\mu_0 i N}{2\pi r}$$

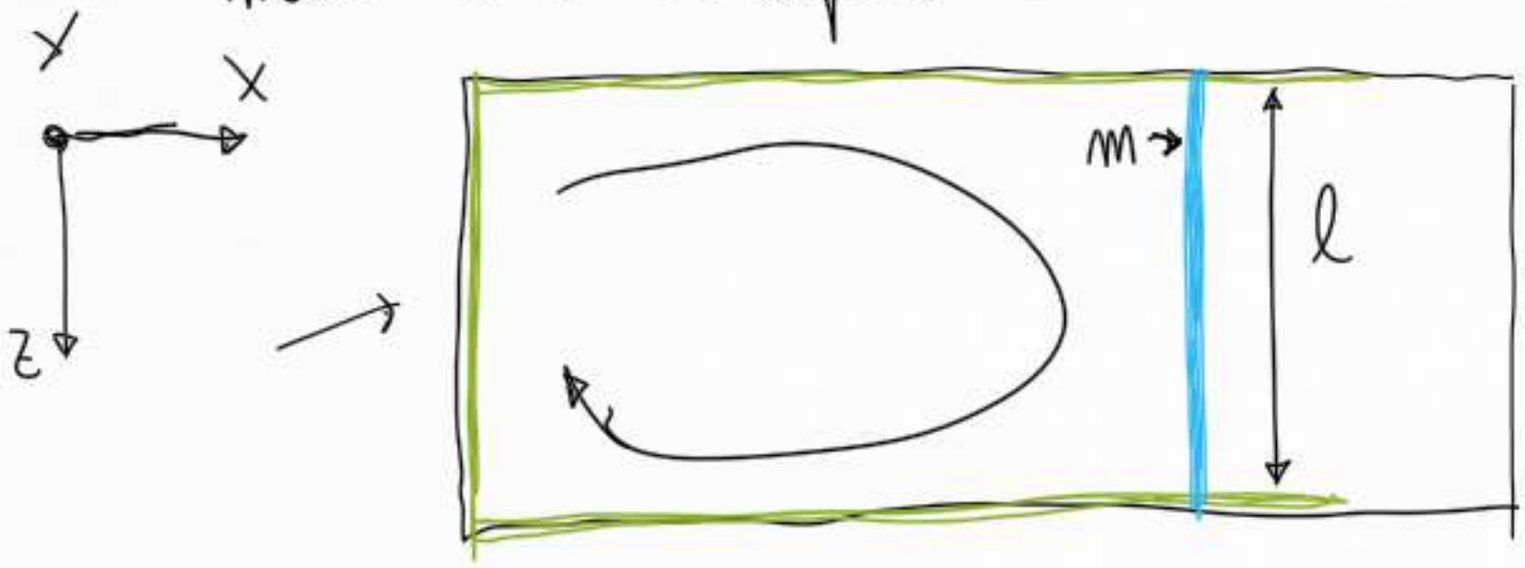


$\theta = \frac{\pi}{6} = 30°$

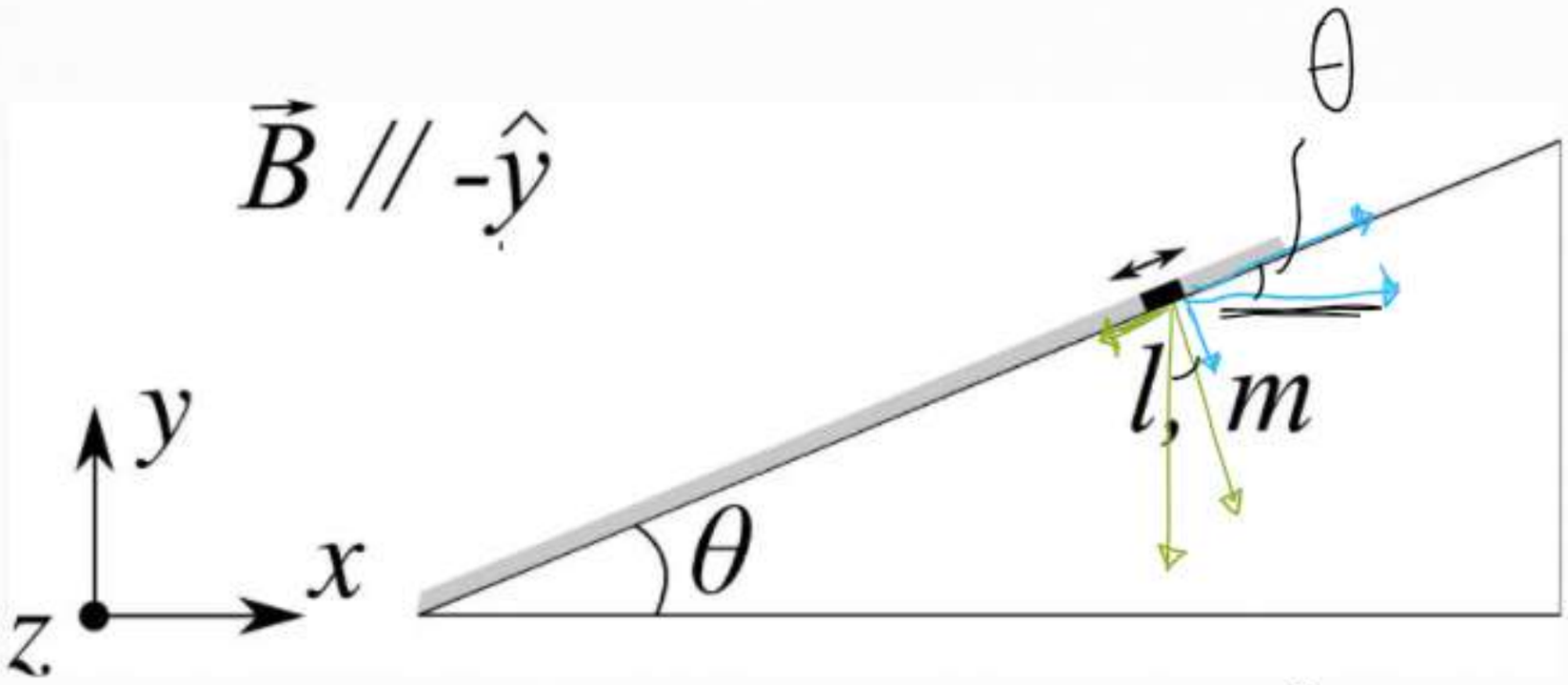
$l = 50\ cm$

$\vec{B} = -B_0 \hat{y}, B_0 = 0.8T$

verso e intensità della i che deve scorrere affinché il lato mobile resti in equilibrio



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



$F_p \sin\theta = F_m \cos\theta \Rightarrow$

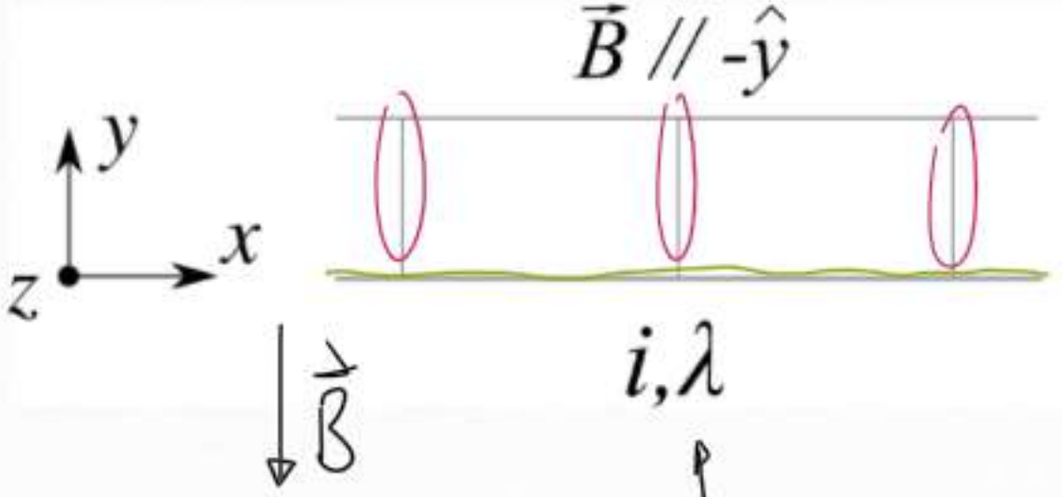
$F_m = F_p \operatorname{tg}\theta$

$i l B = m g \operatorname{tg}\theta \Rightarrow$

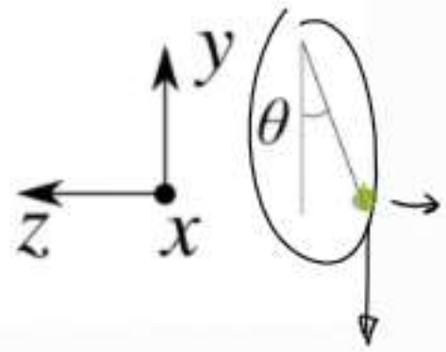
$i = \frac{m g}{l B} \operatorname{tg}\theta$

$\vec{a} \times \vec{b} = \vec{c}$

$|\vec{a} \times \vec{b}| = ab \sin\theta$



densità lineare di massa



$i = ?$ verso e intensità

$$\vec{f} = \frac{d\vec{F}}{d\ell} = i\,\hat{t} \times B$$

$$\vec{f}_p = -\lambda g \hat{y}$$

$\theta = 30°$

$\lambda = 0.12 \ kg/m$

$B = 0,36 \ T$