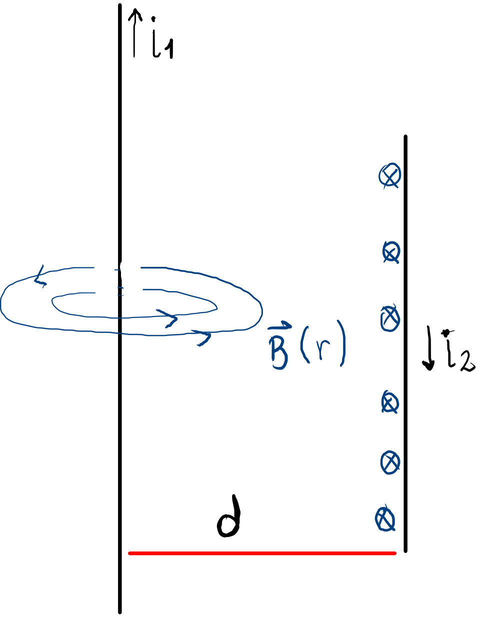
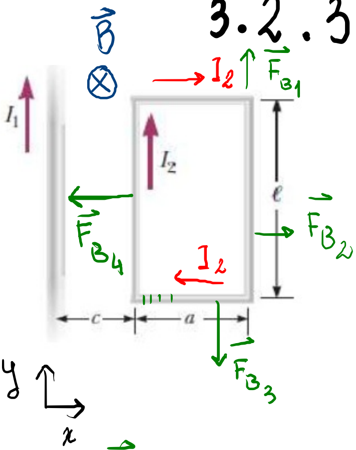


$$|\vec{B}| = \frac{\mu_0 i}{2\pi r} \quad + \quad |\vec{F}_2| = B \cdot i_2 \cdot L$$

$$= \frac{\mu_0 i_1 i_2 L_2}{2\pi d}$$

$\frac{F_2}{L_2}$ = fuerza x metro

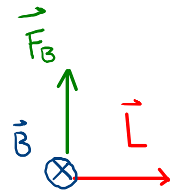
3.2.3



$\vec F_{espira/conductor\ largo}$

$$|\vec B| = \frac{\mu_0 I_1}{2\pi r}$$

$$\vec F_B = I\vec L \times \vec B$$



Por simetría, $\vec F_{B_1} + \vec F_{B_3} = 0$

$$|\vec F_{B_4}| = \ell \cdot I_2 \cdot B_1(r=c) = \ell \cdot I_2 \cdot \frac{\mu_0 I_1}{2\pi c}$$

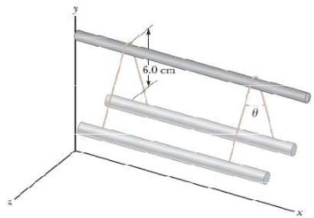
$$|\vec F_{B_2}| = \ell \cdot I_2 \cdot \frac{\mu_0 I_1}{2\pi (c+a)}$$

$$\vec F_N = \frac{\mu_0 \ell I_2 I_1}{2\pi}\left[-\frac{1}{c} + \frac{1}{c+a}\right]\hat x$$

$$= \frac{\mu_0 \ell I_2 I_1}{2\pi}\left[\frac{\cancel{-c} - a + \cancel{c}}{c\,(c+a)}\right]\hat x$$

$\underline{\underline{b}}$ Usamos 3era LEY

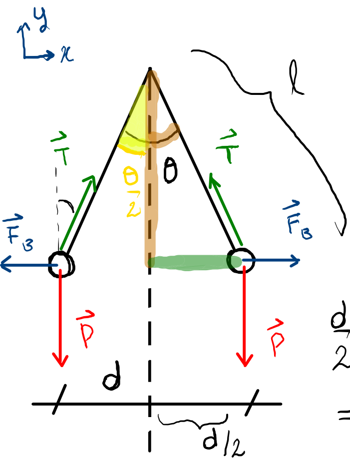
3.2.4



a Intensidades en sentidos opuestos

b ¿I? equilibrio $\leftrightarrow \sum \vec{F} = 0$

$$\begin{cases} \sum F_y = -mg + T \cdot \cos\left(\frac{\theta}{2}\right) = 0 \\ \sum F_x = T \cdot \operatorname{sen}\left(\frac{\theta}{2}\right) - \underbrace{F_B}_{=\frac{\mu_0 L I \cdot I}{2\pi d} = \frac{\mu_0 L I^2}{2\pi d} = \frac{\mu_0 L I^2}{4\pi \ell \tan\left(\frac{\theta}{2}\right)}} = 0 \end{cases}$$



$$\Rightarrow \begin{cases} T \sin\left(\frac{\theta}{2}\right) = \frac{\mu_0 L I^2}{4\pi \ell \tan\left(\frac{\theta}{2}\right)} \\ T \cos\left(\frac{\theta}{2}\right) = mg \end{cases}$$

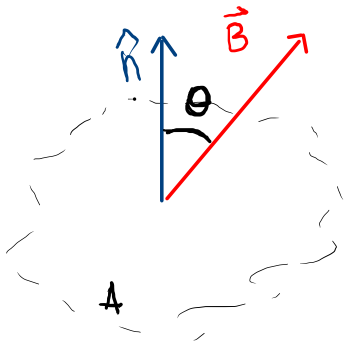
$$\frac{d}{2} = \ell \cdot \tan\left(\frac{\theta}{2}\right)$$

$$\Rightarrow d = 2\ell \tan\left(\frac{\theta}{2}\right) \qquad \tan\alpha = \frac{op}{ad}$$

$$\tan\left(\frac{\theta}{2}\right) = \frac{\mu_0 L I^2}{4\pi \ell \tan\left(\frac{\theta}{2}\right)} \cdot \frac{1}{mg} \Rightarrow I = \sqrt{\frac{4\pi \ell \tan^2\left(\frac{\theta}{2}\right) \lambda g}{\mu_0}}$$

$\lambda = \frac{m}{L}$ = densidad lineal de masa

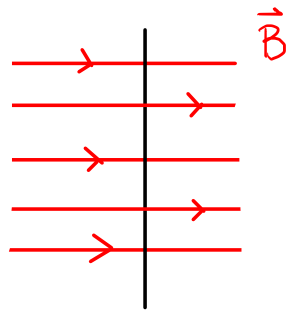
LEY DE FARADAY-LENZ

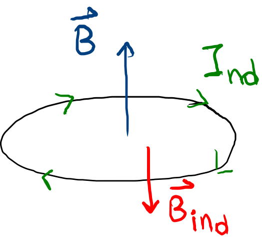


$$\Phi_B = \int \vec{B}\cdot\hat{n}\,da = \vec{B}\cdot\hat{n}\,A$$

$$= BA\cos\theta$$

$$\boxed{\mathcal{E} = -\frac{d\Phi_B}{dt}}$$

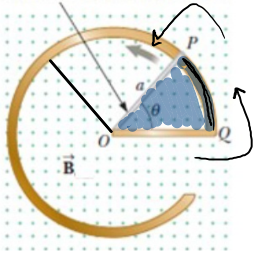




$\vec{B}$ aumenta $\Rightarrow$ Φ_B aumenta $\Rightarrow$ I_{ind} se opone

3.2.7

la varilla rota alrededor de O.



- eligen dirección de $\vec{A}$ ó $\hat{n}$
- con R.M.D. → sentido positivo I
- interpretan

A crece $\Rightarrow \Phi_B$ crece

$$A_0 = \pi r^2 = 2\pi \left(\frac{r^2}{2}\right)$$

$$A(\theta) = \theta\left(\frac{a^2}{2}\right) \Rightarrow \Phi_B(t) = B\underbrace{\left[\frac{a^2}{2}\,\theta(t)\right]}_{A(\theta(t))} \cdot \underbrace{\cos(0^\circ)}_{1}$$

$$\mathcal{E} = -\frac{d\Phi}{dt} = -\frac{Ba^2}{2}\underbrace{\frac{d\theta(t)}{dt}}_{\text{velocidad angular } \omega} = -\frac{Ba^2\omega}{2} = -0.125\,V$$

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

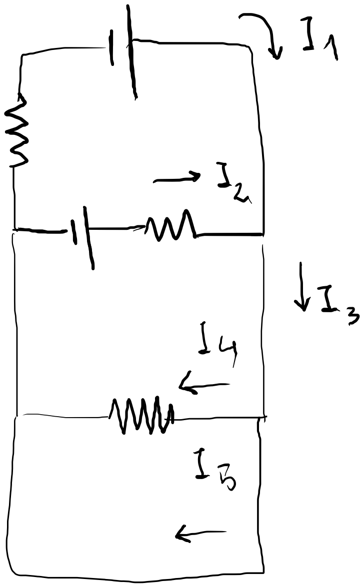
MRU
$x = vt + x_0$
M.C.U.
$\theta = \omega t + \theta_0$

b. $\mathcal{E} = IR = I \cdot R(t)$: $L(t) = 2a + a\theta(t) = a(2+\theta(t)) = a(2+\omega t)$

arco de círculo

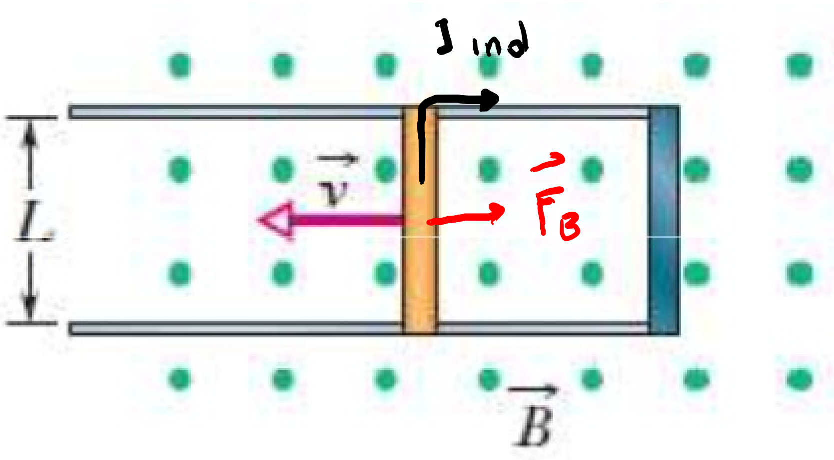
$R(0{,}250\,s) = 6{,}25\,\Omega$

CLASE DE CONSULTA

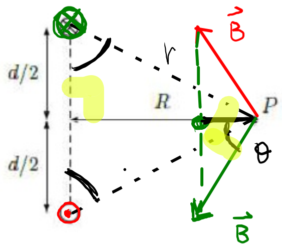


- $I_1 + I_2 = I_3$
- $I_3 = I_4 + I_5$
-

3.2.6

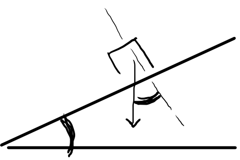


$$\boxed{P = \mathcal{E} \cdot I}$$

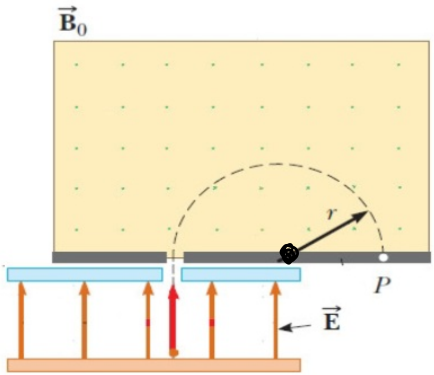


$$|\vec{B}| = \frac{\mu_0 I}{2\pi} \cdot \frac{1}{\underbrace{r}_{=\sqrt{\left(\frac{d}{2}\right)^2 + R^2}}}$$

$$|\vec{B}_N| = 2 \cdot \frac{\mu_0 I}{2\pi} \cdot \frac{1}{\sqrt{\left(\frac{d}{2}\right)^2 + R^2}} \cdot \underbrace{\cos(\theta)}_{=\frac{\frac{d}{2}}{r}} = \frac{\cancel{2}}{\cancel{2}} \frac{\mu_0 I}{\pi} \cdot \frac{1}{\sqrt{\;}} \cdot \frac{d/2}{\sqrt{\;}}$$



$\Delta V, d$



$$R = \frac{mv}{qB} = 1{,}0\ \text{cm}$$

Sale a $2R$

$$E = \frac{\Delta V}{d} \Rightarrow \Delta K = W = F_{el} \cdot d = q\,\frac{\Delta V}{\cancel{d}} \cdot \cancel{d} = q\Delta V$$

$$\Delta K = \frac{m v_f^2}{2} \Rightarrow v_f = \sqrt{\frac{2q\Delta V}{m}} = 4{,}795 \times 10^5\ \frac{m}{s}$$