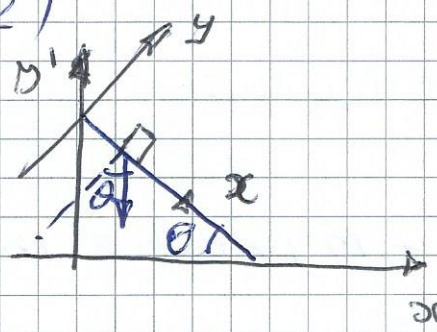
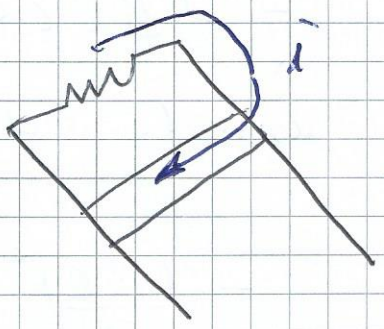
P2)




a) Usamos la regla del flujo:

$$\mathcal{E} = -\frac{d\Phi}{dt}$$

$$\Phi = \iint \vec{B}\cdot d\vec{a}$$

$$\left.\begin{aligned} d\vec{a} &= \ell\, dx\, \hat{y} \\ \vec{B} &= B\hat{y}' \\ &= B(\cos\theta\,\hat{y} - \sin\theta\,\hat{x}) \end{aligned}\right\}$$

$$\vec{B}\cdot d\vec{a} = B\ell\, dx\cos\theta$$

$$\Phi = B\ell x\cos\theta$$

$$\mathcal{E} = \cos\theta\, B\ell v \qquad , \quad v = \frac{dx}{dt}$$

$$I = \frac{\mathcal{E}}{R} = \cos\theta\,\frac{B\ell v}{R}$$

velocidad de la barra a lo largo del riel.

b) Usamos Newton: $\vec{F} = m\frac{d\vec{v}}{dt}$

$\vec{F}$ : fuerza total = magnética + gravitatoria.
$\vec{F}_m$ $\vec{F}_g$

$$d\vec{F}_m = i\, d\vec{\ell}\times\vec{B} = I\, dz\,\hat{z}\times B(\cos\theta\,\hat{y} - \sin\theta\,\hat{x})$$

$$d\vec{F}_m = I\, dz\, B(-\cos\theta\,\hat{x} + \sin\theta\,\hat{y})$$

$$\vec{F}_m = IB\ell(-\cos\theta\,\hat{x} + \sin\theta\,\hat{y})$$

$$\vec{F}_g = mg(-\cos\theta\,\hat{y} + \sin\theta\,\hat{x})$$

húsares