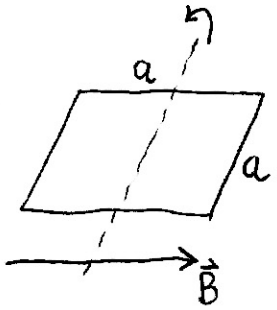
40.) homogén $\vec{B}$ $\quad a = 20\,cm$ $\quad n = 360\,\frac{1}{min}$ $\quad M_{max} = ?$

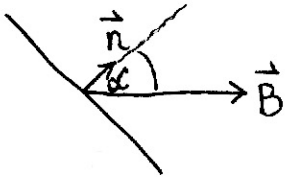
$R = 0{,}01\,\Omega$ $\quad B = 0{,}5\,T$



$$\Phi = \int_F \vec{B}\cdot d\vec{A} \qquad \mathcal{E} = -\frac{d\Phi}{dt}$$

$$\omega = 2\pi n \qquad P = M\omega$$

$$I = \frac{\mathcal{E}_e}{R_e} \qquad P = I^2 R$$



Ha n vagyis ω konstans, akkor a forgatás teljesítménye = Joule-hő teljesítménye $\forall t$-re

$$M\omega = I^2 R \quad (M \text{ max, amikor } I \text{ max})$$

$\alpha = \omega t$
ha $\alpha_0 = 0$
amikor $t = 0$

$$\Phi = \int_F \vec{B}\cdot d\vec{A} = Ba^2\cos\alpha = Ba^2\cos(\omega t)$$

$$\mathcal{E} = -\frac{d\Phi}{dt} = Ba^2\omega\sin(\omega t)$$

$$I = \frac{\mathcal{E}}{R} = \frac{Ba^2\omega}{R}\sin(\omega t) \longrightarrow I_{max} = \frac{Ba^2\omega}{R}$$

$$M_{max}\cdot\omega = I_{max}^2\cdot R$$

$$M_{max} = \frac{I_{max}^2 R}{\omega} = \frac{B^2a^4\omega^2 R}{\omega R^2} = \frac{B^2a^4\omega}{R} = \dots$$