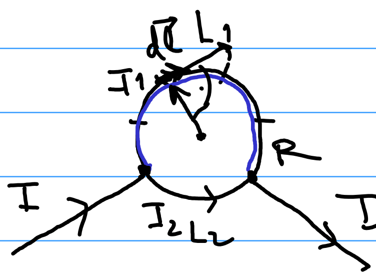
MAGNETOSTATIKA

$$\nabla \cdot \vec{B} = 0$$

$$\nabla \times \vec{B} = \mu_0 \vec{j} \longrightarrow \text{A.Z.} \quad \oint \vec{B} \cdot d\vec{l} = \int \nabla \times \vec{B} \cdot d\vec{S} = \mu_0 I_{in}$$

$$\text{B.S.Z.} \quad d\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi} \frac{d\vec{I} \times \vec{r}}{r^3}$$

3.1.1



B (sred)

$$d\vec{I}_1 = I_1 \cdot d\vec{l}$$

$$B = B_1 + B_2$$

$$d\vec{B}_1 = \frac{\mu_0}{4\pi} \frac{I_1 d\vec{l} \times \vec{r}}{r^3}$$

$$dB_1 = dB_{1z} = \frac{\mu_0}{4\pi} \frac{I_1 \, dl_1}{R^2}$$

$$B_1 = \int_{L_1} \frac{\mu_0}{4\pi} I_1 \cdot \frac{dl_1}{R^2} = \frac{\mu_0 I_1 L_1}{4\pi R^2}$$

$$B_2 = - \frac{\mu_0 I_2 L_2}{4\pi R^2}$$

$$\frac{I_1}{I_2} = \frac{L_2}{L_1}$$

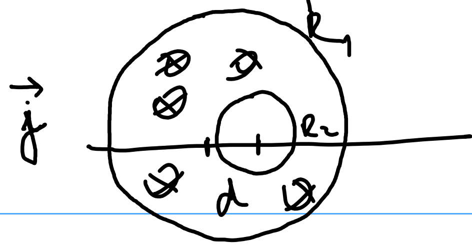
$$I_1 + I_2 = I$$

$$I_1 = I - I_1 \cdot \frac{L_1}{L_2}$$

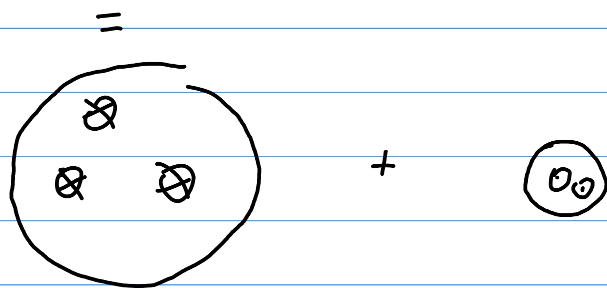
$$I_1 = \frac{I}{1 + \frac{L_1}{L_2}} = \frac{L_2 I}{L_2 + L_1}$$

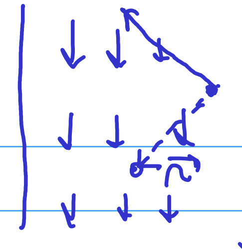
$$B = \frac{\mu_0}{4\pi R^2} \left(\frac{L_2 L_1 I}{L_1 + L_2} - \frac{L_2 L_1 I}{L_1 + L_2} \right) = 0$$

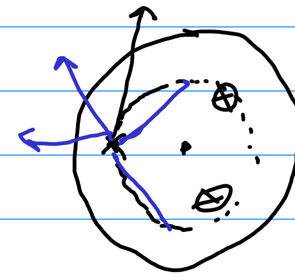
3.1.2.



$\vec{B}$ uvnitř dutiny





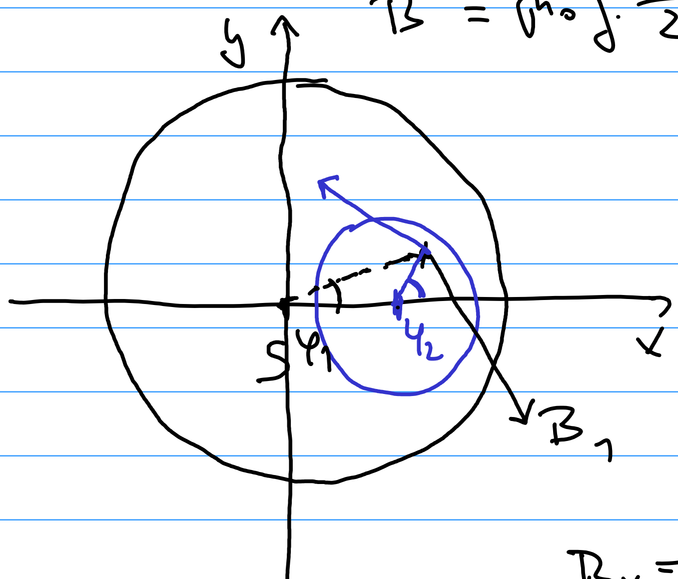


1 vrstva R , B uvnitř

$$\oint \vec{B}\cdot d\vec{l} = \mu_0 I_{in}$$

$$2\pi r B = \mu_0 j \cdot \pi r^2$$

$$B = \mu_0 j \cdot \frac{r}{2}$$



$$B_{1x} = B_1 \cdot \frac{y}{r_1}$$

$$B_{2x} = -B_2 \cdot \frac{y}{r_2}$$

$$B_{1y} = -B_1 \cdot \frac{x_1}{r_1}$$

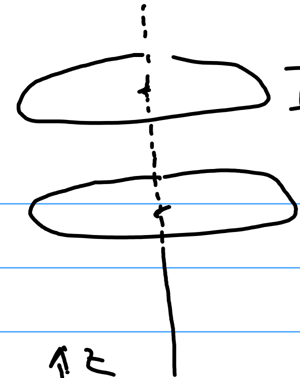
$$B_{2y} = B_2 \frac{x_2}{r_2}$$

$$B_x = \mu_0 \frac{j \cdot r_1 \cdot y}{2 r_1} - \mu_0 \frac{j \cdot r_2 \cdot y}{2 r_2} = 0$$

$$B_y = +\mu_0 j/2 \cdot (x_2 - x_1) = -\frac{\mu_0 j}{2} \cdot d$$

→ HOMOG. POLE VE SMĚRU y !

3.1.3

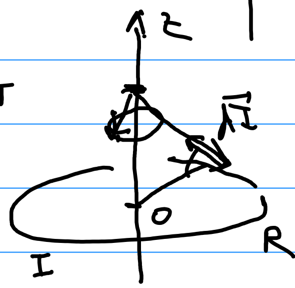


I_1

$I_2 = \pm I_1$

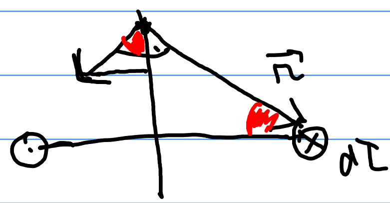
$\vec{B}(\text{osa}) = ?$

1 ZÁVIT



$$d\vec{B} = \frac{\mu_0}{4\pi}\frac{d\vec{l}\times\vec{r}}{r^3}$$

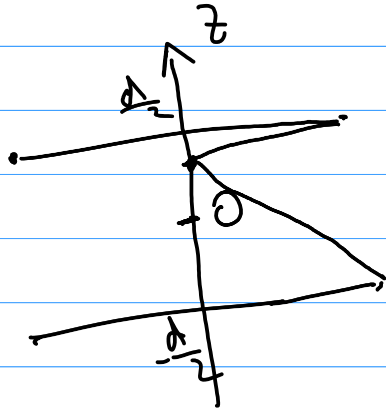
$$\vec{B} = \frac{\mu_0}{4\pi}\int\frac{I\,d\vec{l}\times\vec{r}}{r^3}$$



$$B_z = \frac{\mu_0}{4\pi}I\int_0^{2\pi}\frac{R}{r}\cdot\frac{r\cdot R\,d\varphi}{r^3}$$

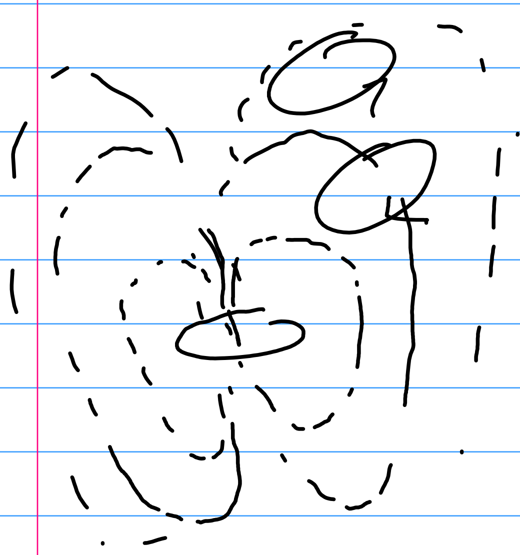
$$\frac{B_z}{B} = \frac{R}{r}$$

$$B_z = \frac{\mu_0}{4\pi}\frac{R^2}{r^3}\cdot 2\pi = \frac{\mu_0 R^2}{2r^3}$$



$$r_{1,2}^3 = \left(R^2 + \left(z \mp \frac{d}{2}\right)^2\right)^{3/2}$$

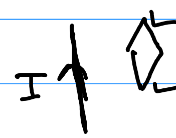
$$B = B_1 + B_2 = \frac{\mu_0 R^2}{2}\left(\frac{1}{\left(R^2+\left(z-\frac{d}{2}\right)^2\right)^{3/2}} + \frac{1}{\left(R^2+\left(z+\frac{d}{2}\right)^2\right)^{3/2}}\right)$$

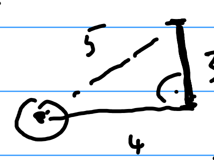


$B = B_1 - B_2$ ..

$$\Phi = \int_S \vec{B}\cdot d\vec{S}$$

DÚ: 3.1.9.





$\Phi(\square) = ?$