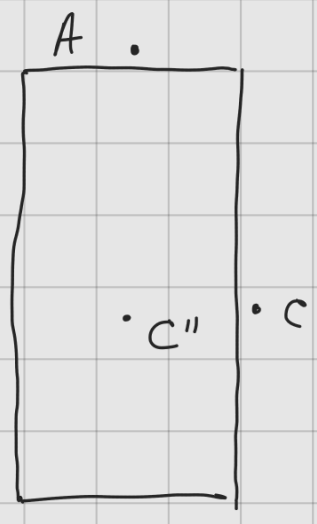
N7.1

$$|F_л| = \left|\frac{q}{c} v B\right| = |qE| \Rightarrow q\frac{d\mathcal{E}_x}{dr}$$

$$d\mathcal{E}_x = \frac{vB\,dr}{c}$$

$$d\mathcal{E}_x = \frac{\omega B r\,dr}{c}$$

$$\mathcal{E} = \int_0^a \frac{\omega B\, r\,dr}{c} = \frac{\omega B a^2}{2c}$$

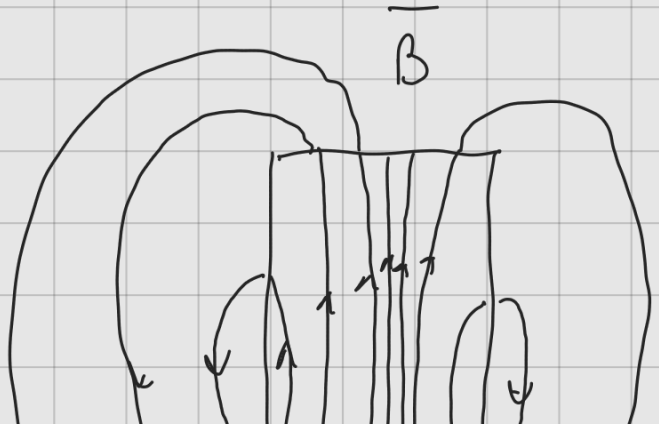


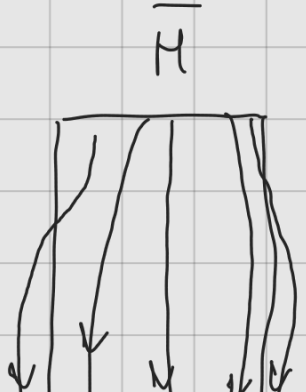
$$B_A = H_A = 2\pi I$$

$$B_C = H_C = B_A \cdot \left(\frac{r}{e}\right)^2 \ll B_A$$

$$B_{C''} \simeq 4\pi I$$

$$H_{C''} = -2\pi I\left(\frac{r}{e}\right)^2$$





Задача

$$\lambda = \ln\left(\frac{a(t)}{a(t+T)}\right) = \frac{1}{Ne}$$

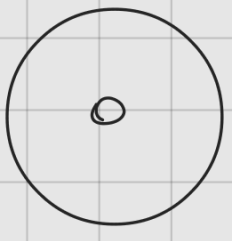
$$Q = \frac{\pi}{\lambda} = \pi Ne = \frac{1}{R}\sqrt{\frac{L}{C}}$$

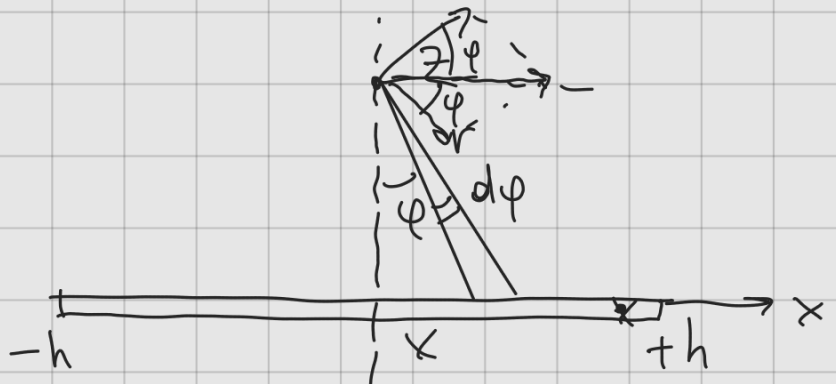
$$Ne_0 = \frac{1}{\pi R}\sqrt{\frac{L_0}{C_0}}; \quad Ne = \frac{1}{\pi R}\sqrt{\frac{L_0}{4C_0}} = \frac{1}{2} Ne_0$$

Т1.

$$\oint H dl = 2\pi r H = \frac{4\pi}{c} J$$

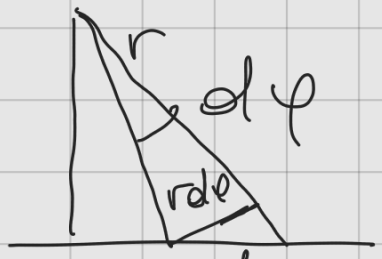
$$H = \frac{2J}{cr}$$





$$dJ = \ldots$$

$$dB_x = \frac{2i\,dx}{cr}\cos\varphi \quad ; \quad r = \frac{z}{\cos\varphi}$$



$$\frac{r\,d\varphi}{\cos\varphi} = dx = \frac{z}{\cos^2\varphi} d\varphi$$

dx

$x = z\,tg\varphi$

$$dx = \frac{z}{\cos^2\varphi}\,d\varphi$$

$$dB_x = \frac{2i}{c}\,\frac{\cos\varphi}{z}\cdot\frac{z}{\cos^2\varphi}\cos\varphi\,d\varphi = \frac{2i\,d\varphi}{c}$$

$$B_x = \frac{2i}{c}\int_{-\varphi_0}^{\varphi_0} d\varphi = \frac{4i}{c}\varphi_0 = \boxed{\frac{4i}{c}\,\mathrm{arctg}\,\frac{h}{z}}$$