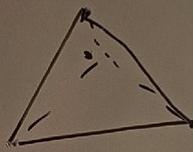


$$\textcircled{1} \quad F = q \cdot E \cdot \frac{S}{S}$$

$$F = \sigma \cdot P$$

\textcircled{2}



$$q \mid r \cdot dF = \frac{q \cdot dy}{r^2} \frac{d\Omega}{ds}$$

$$= q \cdot S \cdot d\Omega = \frac{1}{4} q S \sum_{\text{Nurk}} = q \pi S$$

\textcircled{3}

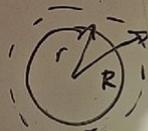
a)



$$ES = 0 \Rightarrow E = 0 \text{ (un.)}$$

$$E = -\nabla \varphi \Rightarrow \varphi - \text{const}$$

$$\varphi(0) = 0 \quad (\varphi = 0 \text{ (pt b; r)})$$



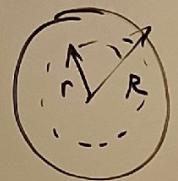
$$E \cdot S = q, q$$

$$E = \frac{q}{R^2}$$

$$\frac{d\varphi}{dr} = -E$$

$$\varphi = - \int E dr =$$

$$= \frac{q}{R} + C \quad (C=0, R \rightarrow \infty)$$



$$E \propto = 4\pi \int \rho dV$$

$$Er^2 = \rho \cdot \frac{4}{3}\pi r^3$$

$$E = \frac{4}{3} \rho \pi r$$

A hand-drawn diagram of a sphere. Inside the sphere, there is a point labeled 'R' representing the radius. A small circle inside the sphere represents a cross-section, with a diagonal line through it representing a radial vector pointing outwards, with the tip of the vector also labeled 'R'. The symbol ' ρ ' is placed to the left of the sphere.

$$E = 4\pi r^2 = 4\pi \rho \frac{4}{3}\pi R^3$$

$$E = \rho \frac{4}{3}\pi \frac{R^3}{r^2}$$

$$\Phi = 4\pi \cdot 6 \cdot 10^{-8} \text{ В} \cdot \text{м}^2 \quad dF_{\perp} = 6 \cdot \cancel{dS} \cdot E$$

$$\Phi = 24\pi e^2 S \quad dF_{\perp} = 6 \cdot d\Phi \quad \cancel{\Phi}$$

$$(\text{через } 6 \text{ грани}) \quad F_{\perp} = 6 \cdot \Phi_{\text{внеш.}}$$

(1 грани от 6 граней)

$$\Phi = 4\pi e^2 S - 2\pi 5e^2 = 2\pi e^2 S$$

$$(am 5 \text{ грани}) \quad \underline{F_{\perp} = 2\pi e^2 S^2}$$

$$S_p = \frac{c^2 \sqrt{3}}{4} \quad \Phi_{max} = 4\pi \cdot 5 c^2 \sqrt{3}$$

$$\frac{\Phi}{4} = 1,5 c^2 \sqrt{3} \text{ (1 m² A)}$$

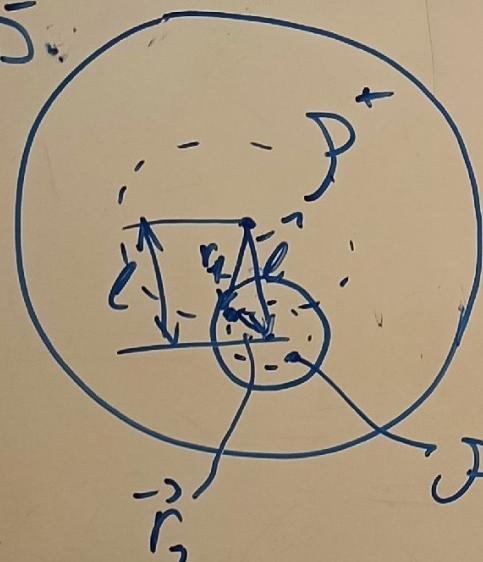
$$\Phi_3 = 1,5 c^2 \sqrt{3} -$$

$$- \frac{1}{2} \pi 1,5 c^2 \sqrt{3}$$

(1 m² A on 3)

$$F_I = \frac{1}{2} \pi 1,5 c^2 \sqrt{3}$$

$$P^+ = -\bar{P}^-$$



$$\vec{E} = \frac{4}{3} \bar{\rho} \vec{r}_1 \vec{r}_1 + \frac{4}{3} \bar{\rho} \vec{r}_2 \vec{r}_2 \quad \textcircled{S}$$

$$P^+, \bar{P}^-$$

$$\textcircled{=} \frac{4}{3} \bar{\rho} (\vec{r}_1 - \vec{r}_2) = \frac{4}{3} \bar{\rho} \vec{r} \vec{e}$$

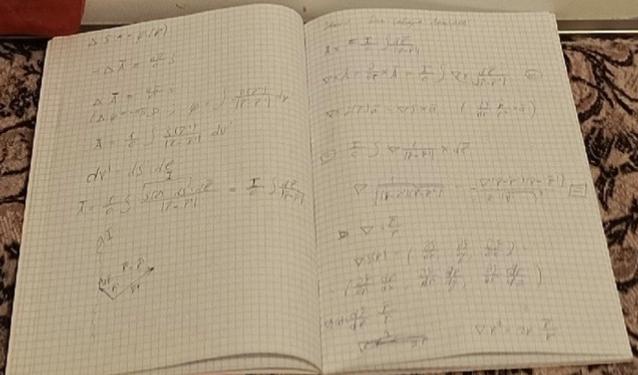
Diagram showing a circular loop of radius R centered at O . A small element of length ds is shown at an angle θ from the vertical diameter. A vector dE is shown at the center O , and a vector S is shown along the radius.

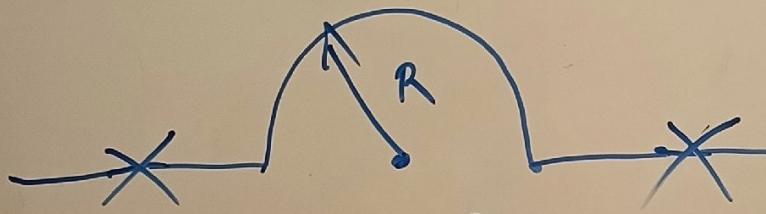
$$d\theta = \frac{I S \sin \theta}{C S^3} = \frac{I S^2 d\theta \sin \theta}{C S^3 \sin \theta} =$$

$$= \frac{I}{c} \left(\frac{d\theta}{s} - \frac{\pi^2}{cR} \right) \sin \theta d\theta =$$

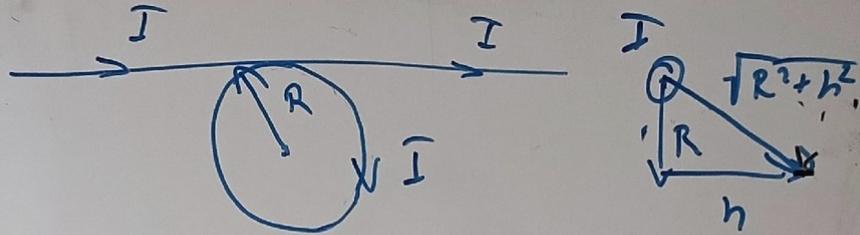
$$= \frac{I}{cR}$$

$$\text{阻抗} = \frac{I}{CR} + \frac{I}{CR} + \frac{I\bar{J}_1 R^2}{C R^3} = \\ = \frac{I}{CR} (2 + \bar{T}_C)$$





$$B = \frac{I \pi R^2}{C R^3} = \underline{\underline{\frac{I \pi}{C R}}}$$



$$B_1(h) = \frac{I}{c} \left\{ \frac{R d\ell}{(R^2 + h^2)^{3/2}} \right\} = \\ = 2\pi \frac{I}{c} \frac{R}{(R^2 + h^2)^{3/2}}$$

$$\oint B d\ell = \frac{4\pi}{c} I \Rightarrow B_2 = \frac{2I}{c \sqrt{R^2 + h^2}}$$

$$\alpha = \frac{\pi}{2} + \beta$$

$$\sin \beta = \frac{h}{\sqrt{R^2 + h^2}} \quad \vec{B} = \vec{B}_1 + \vec{B}_2$$

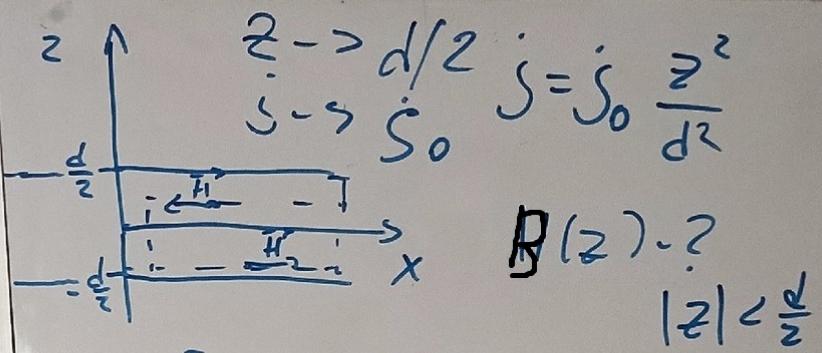
\vec{B}_1 \vec{B}_2

$$|\vec{B}| = |\vec{B}_1|^2 + |\vec{B}_2|^2 - 2|\vec{B}_1||\vec{B}_2| \cos \alpha$$

$$\vec{B} = \frac{2I}{c} \sqrt{\frac{\pi R^4}{(R^2 + h^2)^3} + \frac{1}{R^2 + h^2} + 2 \frac{J_1 R}{(R^2 + h^2)^{5/2}}}$$

$$B(0) = \frac{2I}{c} \sqrt{\frac{J_1^2}{R^2} + 2\pi \cdot \frac{1}{R^2} + \frac{1}{R^2}} = \frac{2I}{cR} (\pi + 1)$$





$$\mathbf{B}(z) \cdot ?$$

$$|z| < \frac{d}{2}$$

$$\oint \mathbf{B} dr = \frac{4\pi}{c} \int j ds$$

$$2 \mathbf{B} e = \frac{4\pi}{c} \int_C \mathbf{j}_0 \frac{z^2}{d^2} e dz$$

$$\mathbf{B} = \frac{2\pi j_0}{3cd^2} z^3 \Big|_{-\frac{d}{2}}^{\frac{d}{2}} = \frac{j_0 d}{6c}$$

$$|z| \geq \frac{d}{2}$$

$$\mathbf{B} = \frac{2\pi j_0}{3cd^2} z^3 + \mathcal{F}' \left(\begin{matrix} z=0 \\ H=0 \end{matrix} \right)$$

$$\text{Mam mauen: } M = I \cdot \alpha^2$$

$$B(\vec{R}) = \frac{1}{c} \cancel{s \vec{R} (\vec{\mu} \cdot \vec{R})} - \cancel{\mu \vec{A}} \vec{R}^2 =$$

$$R^5$$

= gilt generell aufgehängt:

$$B_z = \frac{1}{c} \frac{\mu \sin \alpha}{r^3} \quad B_\parallel = \frac{1}{c} \frac{\mu \cos \alpha}{r^3}$$

$$B = \sqrt{\frac{1}{c^2} \frac{\mu^2 \cos^2 \alpha}{r^6} + \frac{1}{c^2} \frac{\mu^2 \sin^2 \alpha}{r^6}} =$$

$$= \frac{\mu}{c r^3} \sqrt{\cos^2 \alpha + \sin^2 \alpha} = \frac{\mu}{c r^3} \sqrt{3 \cos^2 \alpha + 1}$$