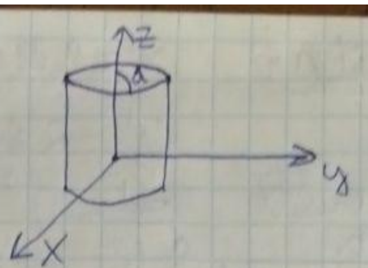
[2] №212 $q = \int_{-\infty}^{+\infty} \gamma dz$

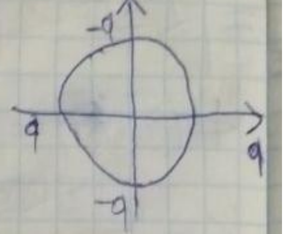


$\vec{p} = \int \gamma z \vec{e}_z dz$

$\vec{p} = 0$

$D_{xx} = \sum q_k (3x^2_\alpha - r^2_k) + q(3a^2 - a^2) = 6qa^2$

$D_{zz} = 0$



$D_{yy} = -6qa^2$

$D_{xy}, D_{xz}, D_{yz} = 0$

$$|D_y| = \begin{pmatrix} 6qa^2 & 0 & 0 \\ 0 & -6qa^2 & 0 \\ 0 & 0 & 0 \end{pmatrix} = 6qa^2 \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

$$\phi(r) = \frac{3q \sin\theta \cos 2\alpha}{r^3}$$

$$\vec{E} = \nabla\phi = -\left(\frac{\partial\phi}{\partial r}\vec{e}_r + \frac{1}{r}\frac{\partial\phi}{\partial\theta}\vec{e}_\theta + \frac{1}{r}\frac{\partial\phi}{\partial\alpha}\vec{e}_\alpha\right) =$$

$$= \frac{-3a \sin\theta \cos 2\alpha}{r^4} \cdot \left(3\sin\theta\, \vec{e}_r + 2\cos\theta\, \vec{e}_\theta + 2\,\mathrm{tg}\,2\alpha\, \vec{e}_\alpha\right)$$

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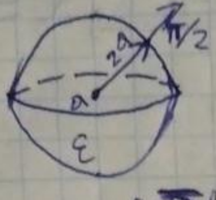

$P_{n_{12}} = \sigma \Rightarrow \oint_S \vec{D} dS = q$

$r < a$, $D\, 4\pi r^2 = q \Rightarrow D = \frac{q}{4\pi r^2}$

$\vec{D} = q\vec{E} \Rightarrow \vec{E} = \frac{q}{4\pi r^2 \varepsilon} \cdot \frac{\vec{r}}{r}$; $\varepsilon = 1 + 4\pi\chi$

$P_{n_{12}} = \chi\vec{E}$, χ – діелекрична сприятливість

$P_{n_{12}} = \left(\frac{\varepsilon - 1}{4\pi}\right)\vec{E} = (\varepsilon - 1)\frac{q}{6\pi^2 r^2 \varepsilon} \cdot \frac{\vec{r}}{r}$; $\underline{\sigma = \frac{\varepsilon - 1}{\varepsilon} \cdot \frac{q}{\pi^2 r^2}}$

$q_{зв} = \sigma\, 4\pi a^2 = \underline{\frac{\varepsilon - 1}{\varepsilon} \cdot \frac{q}{4\pi}}$