HOMOG. NABITÁ KULOVÁ SLUPKA

$$dW = \int_{\infty}^{R} \frac{Q\,dQ}{4\pi\varepsilon_0 r^2}\, dr = -\frac{1}{4\pi\varepsilon_0}\frac{Q\,dQ}{R} \leftarrow \varphi$$

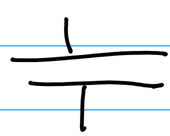
$$E = -W = \frac{1}{4\pi\varepsilon_0}\int_0^Q \frac{Q}{R}\, dQ = \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{2R}$$

NEBO $W = \frac{1}{2}\int \varphi\cdot\rho\, dV = \frac{1}{2}\int \varphi\cdot\sigma\, dS = \frac{1}{2}\frac{1}{4\pi\varepsilon_0}\cdot\frac{Q}{R}(\sigma\cdot S) = \frac{1}{2}\frac{1}{4\pi\varepsilon_0}\frac{Q^2}{R}$

NEBO $W = \frac{1}{2}\int \varepsilon_0 \vec{E}\cdot\vec{E}\, dV = \frac{1}{2}\varepsilon_0 \int_R^{\infty} \frac{Q^2}{16\pi^2\varepsilon_0^2}\frac{4\pi r^2 dr}{r^4} = \dots$

$$\int_R^{\infty}\int_0^{2\pi}\int_0^{\pi} \underbrace{r^2 \sin\vartheta \cdot d\varphi\, d\vartheta\, dr}_{dV}$$

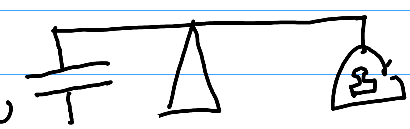
1.4.2 + 1.4.3



C, DESK. JAKÁ SÍLA F PŮSOBÍ NA DESKY PŘI KONST. U

↓

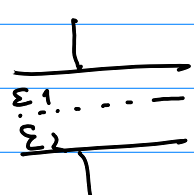
THOMSON



U

přesnost vah Δm

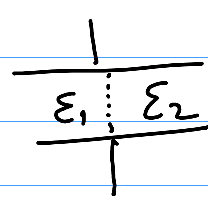
→ přesnost $\Delta U = ?$



ε_1

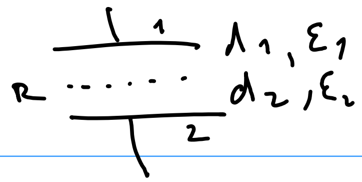
ε_2

$C = ?$



$\varepsilon_1 \quad \varepsilon_2$

$$\vec{P} = \chi\varepsilon_0\vec{E}$$
$$\vec{D} = \varepsilon_0\vec{E} + \vec{P} = \varepsilon\vec{E}$$

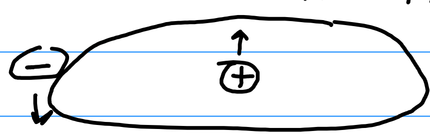


$F_1 = ?$

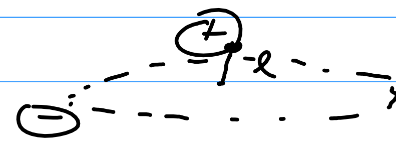
$F_2 = ?$

$F_R = ?$

$F_1 + F_2 + F_R = ?$



$\rightarrow$



$\alpha \vec{E} = \vec{p}$ $\qquad l \ll R$

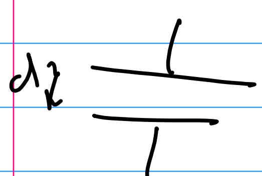
$\varepsilon_r = 1,00026 \longrightarrow \alpha = ?$

CLAUSSIOVA – MOSSOTTIOVA VĚTA

$$\frac{\varepsilon_r - 1}{\varepsilon_r + 2} \underbrace{\overbrace{\frac{M}{\rho}}^{\nearrow \text{ mol. hm.}}}_{\text{hustota}} = \frac{4\pi}{3} \underbrace{N_A}_{\text{Avog.}} \cdot \alpha$$

$\rho = 0,04 \ \frac{kg}{m^3}$

THOMSON. VÁHY



$U = \text{konst.}$ $\qquad \vec{F} = -\nabla W$

$$W = \frac{1}{2} Q \cdot \Delta\varphi = \frac{1}{2} Q U =$$

$$= \frac{1}{2} C U^2$$

$$C = \frac{\varepsilon_0 S}{d}$$

$$W = \frac{1}{2} \frac{\varepsilon_0 S}{d} \cdot U^2$$

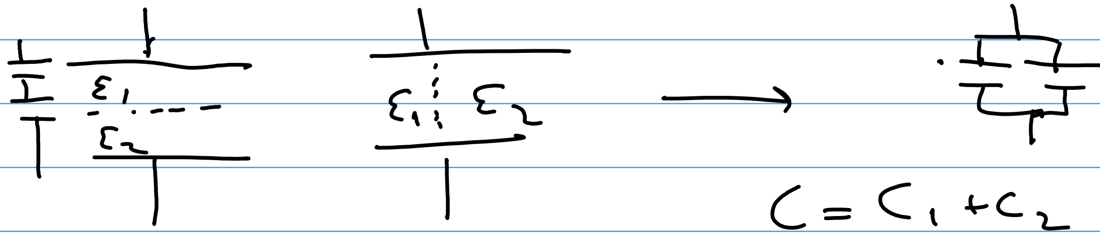
$$\vec{F} = -\frac{\partial W}{\partial d} = \frac{1}{2} \frac{\varepsilon_0 S}{d^2} U^2$$

$$mg = \frac{1}{2} \frac{\varepsilon_0 S}{d^2} U^2$$

$$(m+\Delta m)g = \frac{1}{2}\frac{\varepsilon_0 S}{d^2}(U+\Delta U)^2$$

$$2\frac{d^2}{\varepsilon_0 S}(m+\Delta m)g = U^2 + 2U\Delta U + \cancel{(\Delta U)^2}$$

$$\Delta U = \Delta m g / U \cdot \frac{d^2}{\varepsilon_0 S}$$



$$C = C_1 + C_2$$

$$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} = \frac{d_1}{S\varepsilon_1} + \frac{d_2}{S\varepsilon_2}$$

$$\rightarrow \frac{\varepsilon_1 S_1 + \varepsilon_2 S_2}{d}$$

$$C = \frac{S\varepsilon_1\varepsilon_2}{d_1\varepsilon_2 + d_2\varepsilon_1} = \frac{S\varepsilon_1\varepsilon_2}{d_1\varepsilon_1 + (d-d_1)\varepsilon_1}$$

$$\longrightarrow W = \frac{1}{2}CU^2$$

$$-\frac{\partial W}{\partial d_1}$$

$$-\frac{\partial W}{\partial_2}$$

→ DÚ: DOŘEŠIT

+ DOŘEŠIT

ANSEKKY +

$\varepsilon \dots H$