## koordinatni s.

① kart $(x,y,z)$ $x = r \cdot \sin\vartheta \cdot \cos\varphi = \rho \cdot \cos\varphi$

① valj. $(\rho,\varphi,z)$ $y = r \cdot \sin\vartheta \cdot \sin\varphi = \rho \cdot \sin\varphi$

② krog $(r,\vartheta,\varphi)$ $z = r \cdot \cos\vartheta$

$\rho = \sqrt{x^2+y^2}$ $r = \sqrt{x^2+y^2+z^2}$ $\varphi = \arctg(y/x)$ $\vartheta = \arccos(z/r)$

**Lorenzova sila**

$\int F_L = \int Q(\vec{E} + v \times B)$

**POLJSKA jakost** (točke)

$E = \frac{F}{Q}$ $E = \frac{Q}{4\pi\varepsilon_0 r^2}$ $E = \frac{\varrho}{2\pi\varepsilon_0 r}$

**gostota el.**

$\vec{D} = \varepsilon_0 \cdot \vec{E}$

**Pretok električne**

$i = \frac{dQ}{dt}$ $J = \rho \cdot V$

**Porazdeljene električne**

$Q = \int dQ/d\ell$

$G = \int dQ/dA$

$\rho = dQ/dV$

$\varepsilon_0 = \frac{1}{4\pi \cdot 4 \cdot 10^9} = 8{,}8543 \cdot 10^{-12}$ $As/Vm$

valj: $\mathcal{E} = \frac{d}{2} - S$ $S = \sqrt{\left(\frac{d}{2}\right)^2 - r^2}$

**COULOMB**

$\vec{F}_{12} = \frac{1}{4\pi\varepsilon_0} \frac{Q_1 Q_2}{r_{12}^2} \frac{\vec{r}_{12}}{r_{12}}$

**Mejni pogoji**

$(E_2 - E_1) \times \vec{n} = 0$ $\varepsilon_0 \cdot E_{0n} = \varepsilon_1 \cdot \varepsilon_{1n}$

$(D_2 - D_1) \cdot n = \sigma$

**Gauss**

$\oint_A \vec{E} \cdot d\vec{A} = \frac{Q_{\text{celotno}}}{\varepsilon_0}$

**Potencial**

$V_1 - V_2 = \int_{T_1}^{T_2} \vec{E}\, d\vec{l}$

$V - 0 = \int_{T_1}^{\infty} \vec{E} \cdot d\vec{l}$

**kondenz.**

$\vec{E} = \frac{\sigma}{\varepsilon_0}$, $V = \frac{\sigma}{\varepsilon_0} \cdot x$

**krogelni kondenz**

$\vec{E} = Q/4\pi\varepsilon_0 r^2$

$V = -Q/4\pi\varepsilon_0 r$

**kvak.**

$E = Q/2\pi\varepsilon_0 r$, $V = Q/2\pi\varepsilon_0 \cdot \ln r$

$V = Q/2\pi\varepsilon_0 \cdot \ln\frac{1}{r}$

**Ekscentricnost**

$U = Q/\pi\varepsilon_0 \cdot \ln\frac{s + (d/2 - r_0)}{s - (d/2 - r_0)}$

$F = Q \cdot E = Q \cdot \lambda \cdot \frac{2}{2\pi\varepsilon_0 (2s)}$

**Tockasti dipol:**

$P = \rho \cdot r$

$\int \Pi_e = \int p \times E$

$\int p = \int Q \cdot d$

$\int W = -\int p \cdot E$

**Izolator v ep.**

$P = \chi_e \varepsilon_0 \cdot E$

**el. pretok**

$\Phi_e = \int_A D \cdot dA$

**prelom e.s. polja**

$\frac{\tan\alpha_1}{\tan\alpha_2} = \frac{\varepsilon_1}{\varepsilon_2}$

**kapacitivnost**

$C = \frac{Q}{U}$ [F] $V = P \cdot Q$

$C_{ij} = \frac{Q_{ij}}{V_i - V_j}$

$W = \frac{1}{2} C \cdot U^2 = \frac{1}{2} QV$ izolator

**DELO . POTENC. NAP.**

$dA = dW = F \cdot dl = Q \cdot \vec{E} \cdot d\vec{l}$

$dV = \frac{dW}{Q} = \vec{E} \cdot d\vec{l}$

$F = \frac{Q_1 Q_2}{4\pi\varepsilon_0 r_{12}^2} \cdot \vec{e}_{r12}$

$E = \frac{\sigma}{\varepsilon_0}$ · kondenz $E = \frac{\sigma}{2\varepsilon_0}$

$D = \varepsilon_0 \cdot E$

## kondenzator:

$Q = C \cdot U$

$W = \frac{1}{2} C \cdot U^2 = \frac{1}{2} \frac{Q^2}{C}$

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

VZPOREDNO: $C = C_1 + C_2$; $U = U_1 = U_2$

ZAPOREDNO: $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$; $U = U_1 + U_2$

## UPORNIKI: ALI KEIDA

$U = R \cdot I$

VZPOREDNO: $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$; $U = U_1 = U_2$; $I = I_1 + I_2$

ZAPOREDNO: $R = R_1 + R_2$; $U = U_1 + U_2$; $I = I_1 = I_2$

## UPORNOST PREVODNOST

$R = \frac{\int_a^b \vec{E} \cdot d\vec{l}}{\int \vec{j}\, d\vec{S}}$ $G = \frac{1}{R}$

$W = \frac{1}{2} \iiint \varepsilon |\vec{E}|^2 dv$

$dG = \gamma \cdot \frac{dS}{\lambda}$


$dR = \frac{1}{\gamma} \cdot \frac{d\lambda}{S}$


**moč**

$P = \frac{1}{\gamma} \frac{1}{S}$ $P_{max} = \frac{U_{max}^2}{4R_{max}}$

$P = \frac{U^2}{R} = U \cdot I = R \cdot I^2$

**upornost kabla:**

$R = \frac{\lambda}{\gamma \cdot A}$ $A = \pi\left(\frac{d}{2}\right)^2$ $R = \frac{\varepsilon}{\gamma \cdot c}$

**upornost v radialni smeri**

$R = \frac{1}{2\pi\gamma} \cdot \ln\frac{b}{a}$

**upornost v krožni smeri**

$G = \frac{\gamma h}{\alpha} \cdot \ln\frac{b}{a}$

**TEMPERATURNA ODVISNOST UPORNOSTI**

$R_{th} = R(T_0)(1 + \alpha(T_1 - T_0))$

$\rho(T) = \rho(T_0)(1 + \alpha(T_1 - T_0))$ $\frac{\text{Vrh} \times}{T_2 - T_0}$

## Tokovno polje

$p\left[\frac{W}{m^3}\right]$ $\vec{j}\left[\frac{A}{m^2}\right]$ $\gamma\left[\frac{S}{m}\right]$

$\vec{j} = \gamma \cdot \vec{E}$

gostota izgub

topl. $p = \vec{j} \cdot \vec{E} = \gamma \cdot |\vec{E}|^2 = \frac{|\vec{j}|^2}{\gamma}$

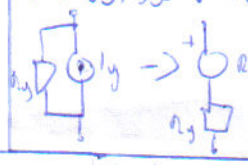
$P = \iiint p \cdot dv$

$E = \vec{e}_x \frac{U}{d}$

$C = \frac{Q \cdot h}{U}$



**Pretvorba v tokovni vir**




## LINEARNA VEZJA:

**SPOJIŠČNI POTENCIALI:**

$I_1 + I_2 + I_g = 0$

$\frac{V_2 - V_1 \pm U}{R} + \ldots = 0$

**ZANČNI TOKOVI**

$U_1 + U_2 + U_3 = 0$

$U_{12} = R_1 I_1 \pm R_2 I_2$

**Thevenin**

$R_{th}$

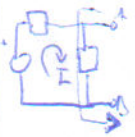
U - kratek stik

I - odprti sponki

$P = \frac{U^2}{4R}$ - max

$U_{th} =$

$\frac{V_A - V_B}{R} = I$ po zankah




**Norton**

$R_N = R_{th}$

$R_N \cdot I_N = U_{th}$

$P = \frac{1}{4} R_n \cdot I_n^2$


**karakteristika**



$U_g = k \cdot I + h$

$U = U_g - R_g \cdot I$