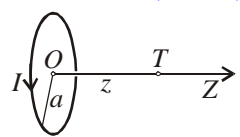
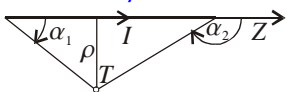
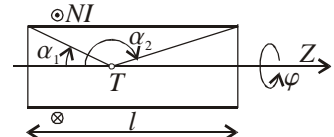
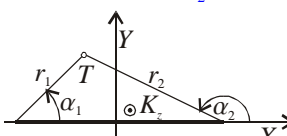
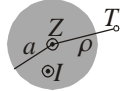
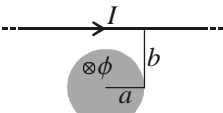
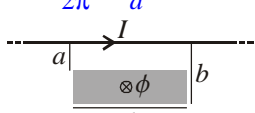
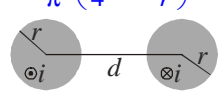


Osnove elektrotehnike II - enačbe in formule

Diferenciali dolžin: dx, dy, dz; dρ, ρ dφ, dz; dr, r dθ, r sin θ dφ	Konstante: $e \cong 1,602 \cdot 10^{-19}$ C, $c_0 = 299792458$ m/s; $\mu_0 = 4\pi \cdot 10^{-7}$ Wb/(A m) $\cong 12,566 \cdot 10^{-7}$ Wb/(A m); $\mu_0 \epsilon_0 c_0^2 = 1$; $\epsilon_0 \cong 8,854 \cdot 10^{-12}$ C/(V m)	Lorentzova sila: $\vec{F}_{\text{Lor.}} = Q(\vec{E} + \vec{v} \times \vec{B})$; $\vec{E} = (\vec{F}_{\text{Lor.}} / Q) _{v=0}$	Magnetna sila na tokovni element: $d\vec{F} = I d\vec{l} \times \vec{B}(T)$
Biot-Savartov zakon: $d\vec{B}(T) = \frac{\mu_0}{4\pi} \frac{I d\vec{l}' \times \vec{R}}{R^3}$	Magnetni pretok: $\phi = \int_A \vec{B} \cdot d\vec{a}$	Lastnosti gostote magnetnega pretoka: $\oint_A \vec{B} \cdot d\vec{a} = 0$; $\oint_C \vec{B} \cdot d\vec{l} = \mu_0 I_{\text{skozi } \mathcal{L}} = \mu_0 \int_A \vec{J} \cdot d\vec{a}$	Magnetni dipol: $\vec{m} = I\vec{S}$; $\vec{M}_m = \vec{m} \times \vec{B}$; $W_{\text{mp}} = -\vec{m} \cdot \vec{B}$
Delo magnetne sile za premik zanke: $A_m = I(\phi_{\text{končni}} - \phi_{\text{začetni}})$	Magnetik: $\vec{H} = \vec{B} / \mu_0 - \vec{M}$; $\vec{M} = \chi_m \vec{H}$; $\vec{B} = \mu \vec{H}$; $\chi_m + 1 = \mu_r$; $\oint_C \vec{H} \cdot d\vec{l} = I_{\text{prosti skozi } \mathcal{L}} = \int_A \vec{J}_{\text{prosti}} \cdot d\vec{a}$	Mejni pogoji: $B_n(T_+) - B_n(T_-) = 0$; $H_{t1}(T_+) - H_{t1}(T_-) = K_{r2 \text{ prosti}}(T)$; $H_{t2}(T_+) - H_{t2}(T_-) = -K_{r1 \text{ prosti}}(T)$; $\vec{n} \times (\vec{H}(T_+) - \vec{H}(T_-)) = \vec{K}_{\text{prosti}}(T)$	Prelom gostotnic: $\frac{\tan \alpha_1}{\tan \alpha_2} = \frac{\mu_1}{\mu_2}$; velja pri $K_{\text{prosti}} = 0$
Magnetna potencial in napetost: $\int_A^B \vec{H} \cdot d\vec{l} = \Theta_{AB} = V_m(A) - V_m(B)$; $dV_m = -\vec{H} \cdot d\vec{l}$; $\vec{H} = -\vec{n} \partial V_m / \partial n$	Magnetni upor: $\phi = G_m \Theta$; $G_m R_m = 1$	Sklep ψ je pretok, ki ga pentlja \mathcal{L} objame v pozitivnem smislu.	Indukcijski zakon: $u_{\text{ind.}} = -d\psi/dt$; $\oint_C \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int_A \vec{B} \cdot d\vec{a}$; $u_{\text{ind.}} = -\int_A \frac{\partial \vec{B}}{\partial t} \cdot d\vec{a} + \oint_C (\vec{v} \times \vec{B}) \cdot d\vec{l}$
Energija: $W_m = \frac{1}{2} \sum_{k=1}^n \sum_{j=1}^n L_{jk} i_j i_k = \frac{1}{2} \sum_{k=1}^n \psi_k i_k$; $w_m = \frac{1}{2} \mu H^2$	Energija magnetenja: $W_{\text{mag.}}(t_1, t_2) = \int_{t_1}^{t_2} i d\psi$; $w_{\text{mag.}}(t_1, t_2) = \int_{t_1}^{t_2} H dB$	Upor: $u = Ri$; $p_l = Ri^2 = W_l'$	Kondenzator: $i = Cu'$; $W_e = \frac{1}{2} Cu'^2$; $p_e = W_e'$
Tlak na reži: $f_{\text{mn}} = B^2 / 2\mu_0$	Tuljava: $u = Li'$; $W_m = \frac{1}{2} Li'^2$; $p_m = W_m'$	Sklop dveh tuljav: $u_1 = L_1 i_1' \pm M i_2'$; $u_2 = \pm M i_1' + L_2 i_2'$; $W_m = \frac{1}{2} L_1 i_1'^2 \pm M i_1 i_2' + \frac{1}{2} L_2 i_2'^2$; $p_m = W_m'$	
Periodična količina, perioda in frekvenca: $g(t+T) = g(t)$; $Tf = 1$	Srednja in efektivna vrednost: $G_{\text{sr.}} = T^{-1} \int_r^{r+T} g(t) dt$; $G_{\text{ef.}}^2 = T^{-1} \int_r^{r+T} g^2(t) dt$	Zakona električnih vezij: $\sum_k (\pm) i_k = 0$; $\sum_m (\pm) u_m = 0$	
Kompleksno število: $e^{\pm j\varphi} = \cos \varphi \pm j \sin \varphi$; $\underline{z} = x + jy$; $x = \text{Re}(\underline{z})$; $y = \text{Im}(\underline{z})$; $ \underline{z} = \text{abs}(\underline{z}) = \sqrt{x^2 + y^2}$; $\alpha = \arg(\underline{z}) = \begin{cases} \arctan y/x, & x \geq 0 \\ \pm\pi + \arctan y/x, & x < 0 \end{cases}$; $\underline{z} = \underline{z} (\cos \alpha + j \sin \alpha)$	Harmonična količina in njen kazalec: $g(t) = G_m \cos(\omega t + \alpha) \Leftrightarrow \underline{G} = G_m e^{j\alpha}$; $g(t) = \text{Re}(\underline{G} e^{j\omega t})$	Moči v kompleksnem: $\underline{S} = P + jQ = \frac{1}{2} \underline{U} \underline{I}^*$; $S = \frac{1}{2} U_m I_m$; $P = \frac{1}{2} U_m I_m \cos \varphi$; $Q = \frac{1}{2} U_m I_m \sin \varphi$	
Imitance elementov: $\underline{Z} = \underline{U} / \underline{I}$; $\underline{Y} = 1 / \underline{Z}$; $\underline{Z}_R = R = 1 / G = 1 / \underline{Y}_R$; $\underline{Z}_L = j\omega L$; $\underline{Y}_C = j\omega C$	Prilagoditev: $\underline{Z}_b = \underline{Z}_{\text{Th}}^* \rightarrow P_{b \text{ maks.}} = \underline{U}_{\text{Th.}} ^2 / (8R_{\text{Th.}})$; $R_b = \underline{Z}_{\text{Th.}} \rightarrow P_{b \text{ maks.}} = \underline{U}_{\text{Th.}} ^2 / (4(R_{\text{Th.}} + \underline{Z}_{\text{Th.}}))$	Krožna tokovna zanka: $B_z(T) = \frac{\mu_0 I}{2} \frac{a^2}{(a^2 + z^2)^{3/2}}$ 	
Tokovna daljica: $B_\varphi(T) = \frac{\mu_0 I}{4\pi \rho} (\cos \alpha_1 - \cos \alpha_2)$ 	Tokovna premica: $\alpha_1 \rightarrow 0, \alpha_2 \rightarrow \pi \rightarrow$ $B_\varphi(T) = \frac{\mu_0 I}{2\pi \rho}$	Dolga tuljava: $B_z(T) = \frac{\mu_0 NI}{2l} (\cos \alpha_1 - \cos \alpha_2)$ 	
Tračni vodnik: $B_x(T) = \frac{\mu_0 K_z}{2\pi} (\alpha_1 - \alpha_2)$; $B_y(T) = \frac{\mu_0 K_z}{2\pi} \ln \frac{r_1}{r_2}$ 	Vodnik okroglega preseka:  $B_\varphi(T) = \begin{cases} \frac{\mu_0 I \rho}{2\pi a^2} & \rho \leq a \\ \frac{\mu_0 I}{2\pi \rho} & \rho > a \end{cases}$	Pretok skozi krog: $\phi = \mu_0 I (b - \sqrt{b^2 - a^2})$ 	Pretok skozi pravokotnik: $\phi = \frac{\mu_0 I l}{2\pi} \ln \frac{b}{a}$ 
Induktivnost dvovoda: $L = \frac{\mu_0 l}{\pi} \left(\frac{1}{4} + \ln \frac{d}{r} \right)$ 		Medsebojna induktivnost dvovodov: $L_{12} = \frac{\mu_0 l}{2\pi} \ln \frac{D_{12} D_{21}}{d_{12} d_{21}}$ 