Formule iz Osnova Elektrotehnike (I dio) koje se mogu koristiti na međuispitima

$$\epsilon_0 = 8.854 \cdot 10^{-12} \frac{As}{Vm}$$

$$\epsilon_r = \frac{\epsilon}{\epsilon_0}$$

$$F = \frac{Q_1 Q_2}{4\pi\epsilon d^2} \qquad \vec{E} = \frac{\vec{F}}{Q}$$

$$E_1 = \frac{\sigma}{2\,\epsilon} \qquad E = \frac{Q}{4\pi\epsilon r^2}$$

$$\varphi_A = \frac{W_p}{Q}$$

$$\varphi(x) = -E \cdot x + \varphi_0$$

$$U_{AB} = \varphi_A - \varphi_B$$

$$A_{12} = W_1 - W_2 = QU_{12}$$

$$C = \frac{Q}{U} \qquad C = \epsilon\frac{S}{d} \qquad U = E \cdot d$$

$$W_C = \frac{QU}{2} = \frac{Q^2}{2C} = \frac{CU^2}{2}$$

$$I = \frac{Q}{t}$$

$$J = NQv \qquad J = \kappa E = \frac{I}{S}$$

$$R = \frac{U}{I} = \frac{1}{G} \qquad R = \rho\frac{l}{S} \qquad G = \kappa\frac{S}{l}$$

$$R_\vartheta = R_{20}[1 + \alpha(\vartheta - 20)]$$

$$W = I^2 Rt$$

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

$$R_{uk} = R_1 + R_2 + \ldots + R_n \qquad \text{(ser.)}$$

$$\frac{1}{R_{uk}} = \frac{1}{R_1} + \frac{1}{R_2} + \ldots \frac{1}{R_n} \qquad \text{(par.)}$$

$$\frac{1}{C_{uk}} = \frac{1}{C_1} + \frac{1}{C_2} + \ldots \frac{1}{C_n} \qquad \text{(ser.)}$$

$$C_{uk} = C_1 + C_2 + \ldots + C_n \qquad \text{(par.)}$$

$$\sum I_{ul} = \sum I_{iz} \qquad \sum_{j=1}^{n} I_j = 0 \quad (\check{c}vor)$$

$$\sum_{j=1}^{n} U_j = 0 \qquad \sum_{j=1}^{n_{iz}} U_{iz} = \sum_{k=1}^{n_R} R_k \cdot I_k \quad (petlja)$$

$$U_{p.h.} = I_{k.\,s.} R_i$$

$$\eta_{strujni} = \frac{R_i}{R_t + R_i} \qquad \eta_{naponski} = \frac{R_t}{R_t + R_i}$$

$$R_1 \cdot R_3 = R_2 \cdot R_4$$

(mosni spoj)

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transformacija: trokut $\longrightarrow$ zvijezda

$$R_1 = \frac{R_{12}R_{31}}{(R_{12} + R_{23} + R_{31})}$$

$$R_2 = \frac{R_{23}R_{12}}{(R_{12} + R_{23} + R_{31})}$$

$$R_3 = \frac{R_{31}R_{23}}{(R_{12} + R_{23} + R_{31})}$$

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transformacija: zvijezda $\longrightarrow$ trokut

$$R_{12} = R_1 + R_2 + \frac{R_1 R_2}{R_3}$$

$$R_{23} = R_2 + R_3 + \frac{R_2 R_3}{R_1}$$

$$R_{31} = R_3 + R_1 + \frac{R_3 R_1}{R_2}$$

$$\mu_0 = 4\pi \cdot 10^{-7} \frac{Vs}{Am}$$

$$\vec{F} = Q(\vec{v} \times \vec{B}) \qquad |\vec{F}| = QvB\sin(\alpha)$$

$$\vec{F} = I(\vec{l} \times \vec{B}) \qquad |\vec{F}| = IlB\sin(\alpha)$$

$$B = \mu_0 \frac{I}{2\pi r} \qquad \Phi = \vec{B}\vec{S} = BS\cos(\alpha)$$

$$|\vec{F_1}| = \mu_0 \frac{I_2 \cdot I_1 \cdot l}{2\pi\, d}$$

$$u_i = Blv \qquad e_{ind} = -N\frac{d\Phi}{dt} = -L\frac{di}{dt}$$

$$L = N\frac{\Phi}{I} \qquad M_{12} = N_2\frac{\Phi_{12}}{I_1} \qquad k = \frac{\Phi_{12}}{\Phi_1}$$

$$M = k\sqrt{L_1 L_2} \qquad e_{M_{ind}} = -M\frac{di}{dt}$$

$$u_L(t) = L\,\frac{di(t)}{dt} \qquad u_M(t) = M\,\frac{di(t)}{dt}$$

$$W_L = \frac{LI^2}{2}$$

$$I_{ef} = \frac{I_m}{\sqrt{2}} \qquad U_{ef} = \frac{U_m}{\sqrt{2}}$$

$$f = \frac{1}{T} \qquad \omega = 2\pi f$$

$$\underline{a} = b + jc = Ae^{j\alpha} = A\angle\alpha$$

$$b = \mathfrak{Re}\{\underline{a}\} = A\cos\alpha$$

$$c = \mathfrak{Im}\{\underline{a}\} = A\sin\alpha$$

$$A = \sqrt{b^2 + c^2}$$

$$u(t) = U_m \sin(\omega t + \alpha)$$

$$\underline{u} = U_m e^{j(\omega t + \alpha)}$$

$$\underline{U_m} = U_m e^{j\alpha} \qquad \underline{U} = Ue^{j\alpha} = \dot{U}$$

$$u(t) = \mathfrak{Im}\{\underline{u}\}$$

$$X_L = \omega L \qquad B_L = \frac{1}{\omega L}$$

$$X_C = \frac{1}{\omega C} \qquad B_C = \omega C$$

$$\underline{Z} = \mathrm{R} \pm j\mathrm{X} \qquad \varphi = \arctan\left(\frac{\mathrm{X}}{\mathrm{R}}\right)$$

$$\underline{Y} = \mathrm{G} \mp j\mathrm{B} \qquad \psi = \arctan\left(\frac{\mathrm{B}}{\mathrm{G}}\right)$$

$$\varphi = -\psi$$

Frekvencijske karakteristike:

$$\mathfrak{Im}\{\underline{Z}\} = 0 \qquad \mathfrak{Im}\{\underline{Y}\} = 0$$

$$\omega_0 = \frac{1}{\sqrt{LC}}$$

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serija RLC:

$$Z(\omega) = \sqrt{R^2 + (\omega L - \frac{1}{\omega C})^2}$$

$$\varphi(\omega) = \arctan\frac{\omega L - \frac{1}{\omega C}}{R}$$

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paralela RLC:

$$Y(\omega) = \sqrt{(\frac{1}{R})^2 + (\omega C - \frac{1}{\omega L})^2}$$

$$\psi(\omega) = \arctan\frac{\omega C - \frac{1}{\omega L}}{\frac{1}{R}}$$

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paralela RL i RC:

$$\omega_0 = \frac{1}{\sqrt{LC}}\sqrt{\frac{R_L^2 - \frac{L}{C}}{R_C^2 - \frac{L}{C}}}$$

$$\rho = \frac{1}{\gamma} = \sqrt{\frac{L}{C}} \qquad B = \frac{\rho}{R}$$