

$\varepsilon_0 = 8,854 \cdot 10^{-12} \frac{\text{As}}{\text{Vm}}$	$\varepsilon_r = \frac{\varepsilon}{\varepsilon_0}$
$u = \frac{dw}{dq}$	$C = \frac{Q}{U}$
$U_{AB} = \varphi_A - \varphi_B$ $A_{12} = W_1 - W_2$	$C = \varepsilon \frac{S}{d}$
$W_C = \frac{Q \cdot U}{2} = \frac{Q^2}{2C} = \frac{C \cdot U^2}{2}$	
$i = \frac{dq}{dt}$	
$R = \frac{U}{I} = \frac{1}{G} \quad R = \rho \frac{l}{S} \quad G = \kappa \frac{S}{l}$ $R_9 = R_{20^\circ} [1 + \alpha(\vartheta - 20^\circ)]$	
$w(t) = \int_{-\infty}^t u(t) \cdot i(t) dt$ $W = I^2 \cdot R \cdot t$	
$p(t) = u(t) \cdot i(t)$ $P = U \cdot I = I^2 \cdot R = \frac{U^2}{R}$	
$R_{\text{uk}} = R_1 + R_2 + \dots + R_n$ (serija)	
$\frac{1}{R_{\text{uk}}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$ (paralela)	
$\frac{1}{C_{\text{uk}}} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n}$ (serija)	
$C_{\text{uk}} = C_1 + C_2 + \dots + C_n$ (paralela)	

I. Kirchhoffov zakon (za čvor): $\sum I_{\text{ul}} = \sum I_{\text{iz}} \quad \sum_{j=1}^n I_j = 0$	
II. Kirchhoffov zakon (za petlju): $\sum_{j=1}^n U_j = 0 \quad \sum_{j=1}^{n_{\text{izvor}}} U_j = \sum_{k=1}^{n_R} R_k \cdot I_k$	
$U = U_{\text{p.h.}} - I \cdot R_i \quad U_{\text{p.h.}} = I_{\text{k.s.}} \cdot R_i$ $\eta_{\text{strujni}} = \frac{R_i}{R_t + R_i} \quad \eta_{\text{naponski}} = \frac{R_t}{R_t + R_i}$	
Naponsko djelilo: $U_1 = U \frac{R_1}{R_1 + R_2}$	Strujno djelilo: $I_1 = I \frac{R_2}{R_1 + R_2}$
Mosni spoj: $R_1 \cdot R_3 = R_2 \cdot R_4$	
Transformacija: trokut → zvijezda $R_1 = \frac{R_{12} \cdot R_{31}}{R_{12} + R_{23} + R_{31}}$ $R_2 = \frac{R_{23} \cdot R_{12}}{R_{12} + R_{23} + R_{31}}$ $R_3 = \frac{R_{31} \cdot R_{23}}{R_{12} + R_{23} + R_{31}}$	
Transformacija: zvijezda → trokut $R_{12} = R_1 + R_2 + \frac{R_1 \cdot R_2}{R_3}$ $R_{23} = R_2 + R_3 + \frac{R_2 \cdot R_3}{R_1}$ $R_{31} = R_3 + R_1 + \frac{R_3 \cdot R_1}{R_2}$	

$L = N \frac{\Phi}{I}$		$u_L(t) = L \frac{di}{dt}$	$W_L = \frac{L \cdot I^2}{2}$
$I_{\text{ef}} = I = \frac{I_m}{\sqrt{2}}$	$U_{\text{ef}} = U = \frac{U_m}{\sqrt{2}}$	$f = \frac{1}{T}$	$\omega = 2\pi \cdot f$
$\underline{a} = b + jc = Ae^{j\alpha} = A\angle\alpha$ $b = \text{Re}\{\underline{a}\} = A \cos \alpha$ $c = \text{Im}\{\underline{a}\} = A \sin \alpha$ $\alpha = \tan^{-1} \frac{c}{b}$ $A = \underline{a} = \sqrt{b^2 + c^2}$			
$\underline{u} = U_m e^{j(\omega t + \alpha)} = U_m \cos(\omega t + \alpha) + jU_m \sin(\omega t + \alpha)$ $u(t) = \text{Im}\{\underline{u}\} = U_m \sin(\omega t + \alpha)$ $\underline{U} = U e^{j\alpha} = U\angle\alpha = \dot{U}$			
$X_L = \omega L$ $X_C = \frac{1}{\omega C}$ $X = X_L - X_C$ $\underline{Z} = R + jX$ $Z = \underline{Z} $ $\varphi = \tan^{-1} \frac{X}{R}$	$B_L = \frac{1}{\omega L}$ $B_C = \omega C$ $B = -B_L + B_C$ $\underline{Y} = G + jB$ $Y = \underline{Y} $ $\psi = \tan^{-1} \frac{B}{G}$	$\underline{Z} = \frac{1}{\underline{Y}}$ $Z = \frac{1}{Y}$ $\varphi = -\psi$	
EFEKTIVNE I SREDNJE VRIJEDNOSTI STRUJE I NAPONA			
$Y_{\text{ef}} = \sqrt{\frac{1}{T} \int_0^T y^2(t) dt}$		$Y_{\text{sr}} = \frac{1}{T} \int_0^T y(t) dt$	$\xi = \frac{Y_{\text{ef}}}{Y_{\text{sr}}}$
Za složene valne oblike:	$Y_{\text{ef}} = \sqrt{Y_0^2 + Y_{\text{ef}_1}^2 + \dots + Y_{\text{ef}_n}^2}$		
	$Y_{\text{sr}} = Y_{\text{sr}_0} \frac{T_i}{T}$ $Y_{\text{ef}} = Y_{\text{ef}_0} \sqrt{\frac{T_i}{T}}$		
NESINUSOIDNE POBUDE U ELEKTRIČNOM KRUGU			
$I_{\text{ef}} = \sqrt{I_0^2 + I_{\text{ef}_1}^2 + \dots + I_{\text{ef}_n}^2}$		$U_{\text{ef}} = \sqrt{U_0^2 + U_{\text{ef}_1}^2 + \dots + U_{\text{ef}_n}^2}$	
$P = P_0 + P_1 + \dots + P_n$			

FREKVENCIJSKE KARAKTERISTIKE		
Uvjet za rezonanciju:		Rezonancija za RLC spoj:
$\text{Im}\{\underline{Z}\} = 0 \quad \text{Im}\{\underline{Y}\} = 0$		$\omega_0 = \frac{1}{\sqrt{LC}}$
Serijska RLC :	$Z(\omega) = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}$	$\varphi(\omega) = \tan^{-1} \frac{\omega L - \frac{1}{\omega C}}{R}$
Paralelna RLC :	$Y(\omega) = \sqrt{\left(\frac{1}{R}\right)^2 + \left(\omega C - \frac{1}{\omega L}\right)^2}$	$\psi(\omega) = \tan^{-1} \frac{\omega C - \frac{1}{\omega L}}{\frac{1}{R}}$
Rezonancija za paralelu RL i RC :	Valni otpor ρ i valna vodljivost γ :	Faktori dobrote RLC spoja:
$\omega_0 = \frac{1}{\sqrt{LC}} \cdot \sqrt{\frac{R_L^2 - \frac{L}{C}}{R_C^2 - \frac{L}{C}}}$	$\rho = \frac{1}{\gamma} = \sqrt{\frac{L}{C}}$	$Q_{\text{serijska}} = \frac{\rho}{R}$ $Q_{\text{paralelna}} = \frac{\gamma}{G}$
Serijski RLC krug priključen na idealni naponski izvor:		
$\omega_{\text{gg}} = \frac{R + \sqrt{R^2 + 4\frac{L}{C}}}{2L} \quad \omega_{\text{dg}} = \frac{-R + \sqrt{R^2 + 4\frac{L}{C}}}{2L}$		
$\Delta\omega = \omega_{\text{gg}} - \omega_{\text{dg}} \quad Q_s = \frac{\omega_0}{\Delta\omega}$		
Uvjet za postojanje maksimuma napona na induktivitetu i kapacitetu:		
$Q_s > \frac{1}{\sqrt{2}}$		

SNAGA U IZMJENIČNIM KRUGOVIMA
$S = U \cdot I$
$P = U \cdot I \cdot \cos \varphi \quad Q = U \cdot I \cdot \sin \varphi$
$S^2 = P^2 + Q^2$
$\cos \varphi = \frac{P}{S}$
$S = \dot{U} \cdot \dot{I}^* $
$P = \text{Re}\{\dot{U} \cdot \dot{I}^*\} \quad Q = \text{Im}\{\dot{U} \cdot \dot{I}^*\}$
$P_R = I_R^2 \cdot R = \frac{U_R^2}{R}$
$Q_X = I_X^2 \cdot X = \frac{U_X^2}{X}$
$S = I_Z^2 \cdot Z = \frac{U_Z^2}{Z}$
$P_{\text{uk}} = \sum P_R$
$Q_{\text{uk}} = \sum Q_L - \sum Q_C$
$S_{\text{uk}} = \sqrt{P_{\text{uk}}^2 + Q_{\text{uk}}^2}$
Prilagođenje na najveću snagu:
$\underline{Z}_t = \underline{Z}_i^*$
$R = \underline{Z}_i $