Equation & Units: [units in square brackets]

$V = IR$ [1 V=1 A·Ω] $P = IV$ [1 W=1 A·V]

$R_S = R_1 + R_2 + \ldots$ $\dfrac{1}{R_P} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \ldots$

$1/C_S = 1/C_1 + 1/C_2 + 1/C_3 + \ldots$ $C_p = C_1 + C_2 + C_3 + \ldots$

$V_C = Q/C$ [1 V = 1 C/F] $\tau_{RC} = RC$ [1 s = 1 Ω·F]

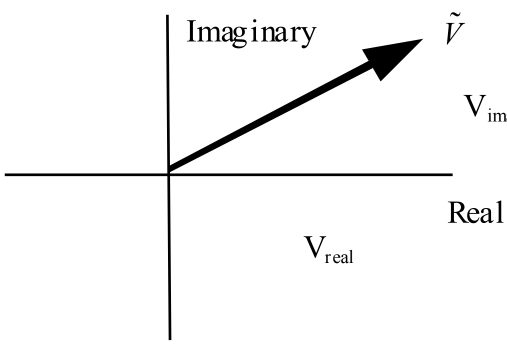
$V_L = L(di/dt)$ [1 V = 1 H·A/s] $\tau_{RL} = L/R$ [1 s = 1 H/Ω]

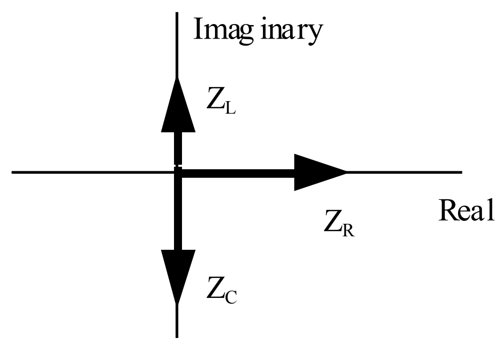
$|X_C| = 1/\omega C = 1/2\pi f C$ $Z_C = -j/\omega C = -j/2\pi f C$ [Ω = 1/Hz·F] $j = \sqrt{-1}$

$|X_L| = \omega L = 2\pi f L$ $Z_L = j\omega L = j2\pi f L$ [Ω = Hz·H] $\omega = 2\pi f$

$V = \sqrt{(V_{\text{real}})^2 + (V_{\text{imaginary}})^2}$ $\phi = \tan^{-1}(V_{\text{imaginary}}/V_{\text{real}})$ $\tilde{V} = Ve^{j\phi_V}$

$\tilde{A} \times \tilde{B} = A \times Be^{j(\phi_A + \phi_B)}$ $\tilde{A}/\tilde{B} = (A/B)e^{j(\phi_A - \phi_B)}$ $\tilde{v} = \tilde{i}\tilde{Z}$





$\dfrac{v_s}{v_p} = \dfrac{N_s}{N_p}$ $P_p \approx P_s$ $\dfrac{Z_s}{Z_p} = \left(\dfrac{N_s}{N_p}\right)^2$

$C \approx \dfrac{i}{\Delta V \cdot f}$ [F = A/(V·Hz)] $r = \dfrac{\Delta V}{V_{DC}}$ $V_p = \sqrt{2} \cdot V_{rms}$

$I_B = I_E - I_C$ $I_C = \beta I_B$ $V_E = V_B - 0.6\ \text{V}$

$V_{out} = A(V_+ - V_-)$

Golden Rules for Ideal Op Amps with negative feedback:

1. The output will adjust in any way possible to make the inverting input and the non-inverting input terminals equal in voltage.
2. The inputs draw no current.

Nyquist criterion: $f_{\text{sample}} > 2f_{\max}$ $\dfrac{Integer}{2^n} = \dfrac{V_{\text{analog}}}{V_{\max}}$