$$v = \frac{dw}{dq}$$ $$i = \frac{dq}{dt}$$ $$p(t) = v(t)i(t)$$ $$w = \int_{t_1}^{t_2} p(t)\,dt$$ $$V = R \times I$$ $$\Sigma I_{in} = \Sigma I_{out}$$ $$\Sigma V = 0$$

$$R_{EQ} = \sum_{n=1}^{N} R_n$$ $$R_{EQ} = \frac{R_1 R_2}{R_1 + R_2}$$ $$V_{R2} = V_i \frac{R_2}{R_1 + R_2}$$ $$I_{R2} = \frac{R_1}{R_1 + R_2} I_i$$

$$V_{med} = \frac{1}{T}\int_{t_0}^{t_0+T} v(t)dt$$ $$V_{ef} = V_{rms} = \sqrt{\frac{1}{T}\int_{t_0}^{t_0+T} v^2(t)dt}$$ $$V_{ef} = V_{rms} = \frac{V_m}{\sqrt{2}}$$

$$\omega = 2\pi f = 2\pi/T \qquad \tau = RC \qquad \tau = L/R$$ $$j^2 = -1$$

$$q_c = Cv_c \qquad i_c = C\frac{dv_c}{dt} \qquad v_c(t) = \frac{1}{C}\int_{t_0}^{t} i_c dt + v_c(t_0)$$ $$w(t) = \frac{1}{2}Cv^2(t)$$ $$z = a + jb$$ $$|z| = \sqrt{a^2 + b^2}$$

$$v_L = L\frac{di_L}{dt} \qquad i_L(t) = \frac{1}{L}\int_{t_0}^{t} v_L dt + i_L(t_0)$$ $$w(t) = \frac{1}{2}Li^2(t)$$ $$\phi = \tan^{-1}\left(\frac{b}{a}\right)$$

$$v_C(t) = V_i e^{-t/RC}$$ $$v_C(t) = V_s - V_s e^{-t/RC}$$ $$i_L(t) = I_f - I_f e^{-tR/L}$$

$$v_C(t) = V_{final} - (V_{final} - V_{inicial})\, e^{-t/RC}$$

$$Z_C = -j\frac{1}{\omega C} = \frac{1}{j\omega C} = \frac{1}{\omega C}\angle{-90°}$$ $$Z_L = j\omega L = \omega L \angle 90°$$

$$f_B = \frac{1}{2\pi RC}$$ $$H(f) = \frac{1}{1 + j(f/f_B)}$$ $$H(f) = \frac{V_{out}}{V_{in}} = \frac{j(f/f_B)}{1 + j(f/f_B)}$$ $$|H(f)|_{dB} = 20\log|H(f)|$$

$$V_r = I_{Lmed}\,T/C \qquad I_{Lmed} \approx V_{Lmed}/R_L \qquad V_r = I_{Lmed}\,T/2C$$

$$i_D = K\left[2(v_{GS} - V_{to})v_{DS} - v_{DS}^2\right]$$ $$i_D = K_p[2(v_{SG} + V_{TP})v_{SD} - v_{SD}^2]$$ $$i_D = K_p(v_{SG} + V_{TP})^2$$

$$i_D = K(v_{GS} - V_{to})^2$$ $$g_m = 2K(v_{GS} - V_{to})$$

$$A_v = \frac{v_o}{v_{in}} = -\frac{R_2}{R_1}$$ $$A_v = \frac{v_O}{v_I} = 1 + \frac{R_2}{R_1}$$

$$\begin{aligned} v_{a\,max} &= (2^{n-1} + 2^{n-2} + \cdots + 2^1 + 2^0)\,\delta v \\ &= (2^n - 1)\,\delta v \end{aligned}$$