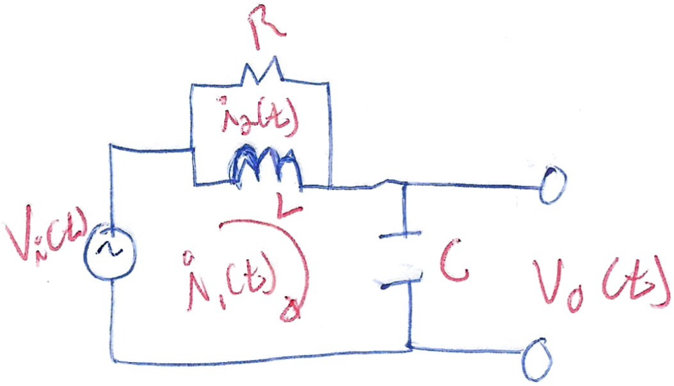
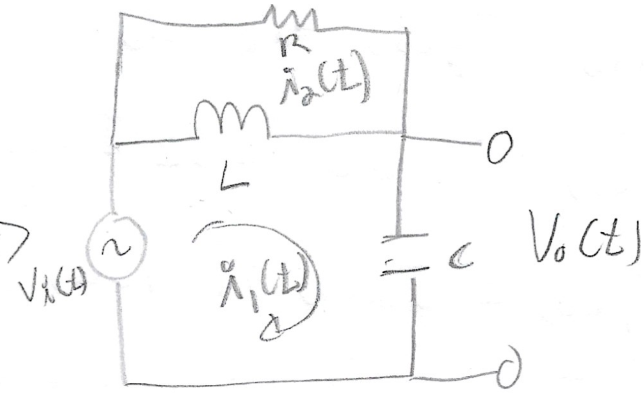


$\Rightarrow$



observando el circuito tenemos 4 variables $\Rightarrow$ 3 ecuaciones

$$V_i(t) = \frac{1}{C}\int i_1(t)\,dt + L\frac{di_1(t)}{dt} - L\frac{di_2(t)}{dt} \quad \ldots\ (1)$$

$$0 = R\,i_2(t) + L\frac{di_2(t)}{dt} - L\frac{di_1(t)}{dt} \quad \ldots\ (2)$$

$$V_o(t) = \frac{1}{C}\int i_1(t)\,dt \quad \ldots\ (3)$$

Aplicando la transformada de Laplace

$$V_i(s) = \frac{1}{sC} I_1(s) + sL\,I_1(s) - sL\,I_2(s)$$

$$= I_1(s)\left(\frac{1}{sC} + sL\right) - sL\,I_2(s)$$

$$= I_1(s)\left(\frac{1 + s^2CL}{sC}\right) - sL\,I_2(s) \quad \ldots\ (4)$$

$$0 = R\,I_2(s) + sL\,I_2(s) - sL\,I_1(s)$$

$$= I_2(s)(R + sL) - sL\,I_1(s) \quad \ldots\ (5)$$

$$V_o(s) = \frac{1}{sC} I_1(s) \Rightarrow sC \cdot V_o(s) = I_1(s) \quad \ldots\ (6)$$

despejando $I_2(s)$ de (5)

$$0 = I_2(s)(R+sL) - sL \cdot I_1(s)$$

$$sL\, I_1(s) = I_2(s)(R+sL)$$

$$\frac{sL}{(R+sL)} \cdot I_1(s) = I_2(s) \ldots\ldots (7)$$

Sustituyendo (7) y (6) en (4)

$$V_{in}(s) = [sC \cdot V_0(s)]\left(\frac{1+s^2CL}{sC}\right) - sL\left[\frac{sL}{(R+sL)}\right] \cdot sCV_0(s)$$

$$V_{in}(s) = V_0(s) \cdot \left[(1+s^2CL) - \frac{s^3L^2C}{R+sL}\right]$$

$$\frac{V_{in}(s)}{V_0(s)} = \frac{(1+s^2CL)(R+sL) - s^3L^2C}{R+sL}$$

$$\frac{V_{in}(s)}{V_0(s)} = \frac{R+sL+s^2CLR+\cancel{s^3L^2C}-\cancel{s^3L^2C}}{R+sL}$$

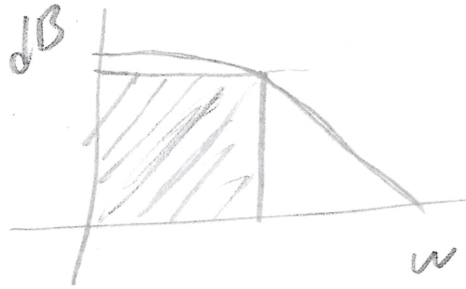
$$\frac{V_{in}(s)}{V_0(s)} = \frac{R+sL+s^2CLR}{R+sL}$$

$$\frac{V_0(s)}{V_{in}(s)} = \frac{sL+R}{s^2CLR+sL+R} \quad \text{F.T}$$

Evaluando los límites

$K = \lim_{s \to 0} G(s) \approx 1$

$\Rightarrow$



Filtro pasa bajas

$K = \lim_{s \to \infty} G(s) \approx 0$

Determinando orden y exactitud

orden = segundo

exactid = dos

Número de polos y 0's que conforman al sistema

Número de Polos = dos

Número de Ceros = Uno

Analizando la estabilidad

Con base en el denominador de la F.T del sistema

$$s_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$s^2CLR + sL + R$

$a = CLR$

$b = L$

$c = R$