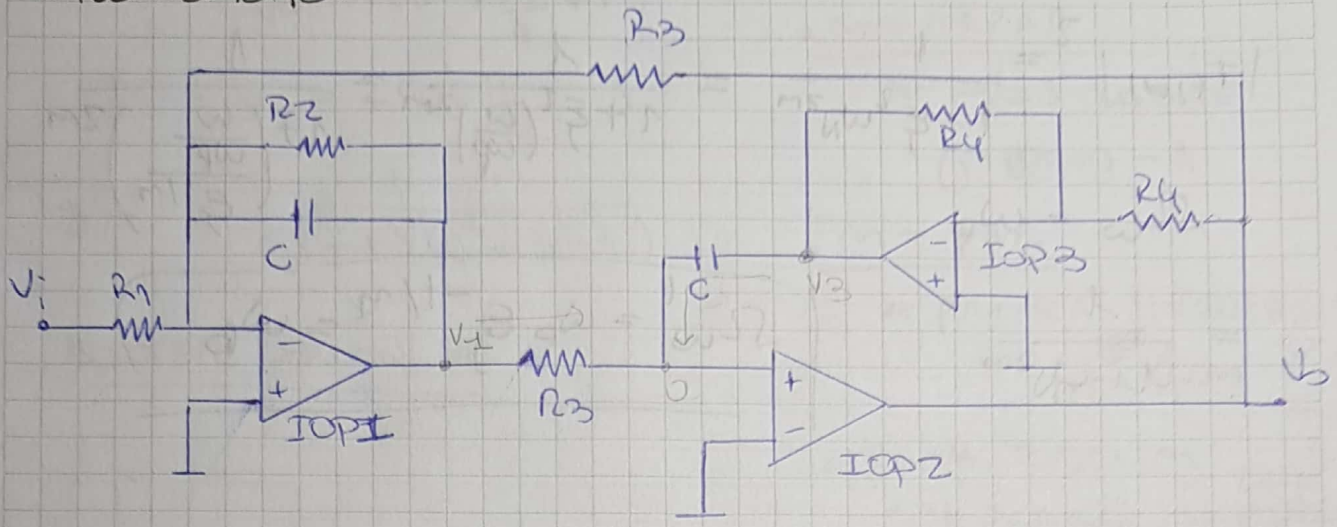
Tarea semanal 2



$$\frac{V_i}{R_1} = -V_1 SC_1 - \frac{V_1}{R_2} - \frac{V_o}{R_3}$$

$$\frac{V_o}{R_4} = \frac{-V_3}{R_4} \qquad V_o = -V_3 \qquad \frac{V_1}{R_3} = -V_3 SC$$

$$V_3 = \frac{-V_1}{SCR_3}$$

$$-V_1 = -V_o SCR_3$$

$$\frac{V_i}{R_1} = -V_o S^2 C^2 R_3 - V_o SCR_3 - \frac{V_o}{R_3}$$

$$\frac{V_i}{R_1} = -V_o\left(S^2C^2R_3 + \frac{SCR_3}{R_2} + \frac{1}{R_3}\right) = -V_o\left(\frac{S^2C^2R_3^2R_2 + SCR_3 + R_2}{R_3R_2}\right)$$

$$-\left(\frac{R_3}{R_1}\right)\frac{\frac{R_3}{C^2R_3^2}}{S^2 + \frac{S}{CR_3R_2} + \frac{\frac{1}{C^2R_3^2}}{\omega_0^2}} \qquad \frac{\omega_0^2}{\omega_0^2}$$

$$\frac{\omega_0}{Q} = \frac{1}{CR_2} \qquad Q = \frac{R_2}{R_3}$$

$$\omega_0 = 1 = \frac{1}{CR_3}$$

$$C = \frac{1}{R_3}$$

$$\frac{\omega_0}{Q}$$

$$20\,dB \longrightarrow \frac{R_3}{R_1} = 40$$

$C = 1\,mf$

$R_1 = 100\Omega$

$R_2 = 3K\Omega$

$R_3 = 1K\Omega$

$R_4 = 100\Omega$

NOTA

$$\frac{1}{CR_2} + \frac{1}{CR_2} =$$

HOJA N°

FECHA

$$T(s) = -\left(\frac{R_3}{R_1}\right) \frac{\omega_0^2}{s^2 + \frac{s\omega_0}{Q} + \omega_0^2}$$

NORMA DE FREC.

$$\$ = \frac{s}{\omega_0} \qquad s_{\omega=\omega_0} = \frac{1}{R_3 C}$$

$$T(\$) = -\left(\frac{R_3}{R_1}\right) \frac{1}{\$^2 + \$\frac{1}{Q} + 1}$$

NORMA DE IMPEDANCIA

$$s_{z=R_3} \rightarrow \text{[illegible]} \qquad \omega_0 = \frac{1}{R_3 C} \rightarrow C = \frac{1}{R_3} \rightarrow$$

~~[illegible]~~ =

$$Q = \frac{R_2}{R_3} \rightarrow R_2 = Q R_3 \rightarrow$$

$$K = \frac{R_3}{R_1} \rightarrow R_1 = \frac{R_3}{K}$$

SENSIBILIDAD

$$S_C^{\omega_0} = \frac{C}{\omega_0} \cdot \frac{d\omega_0}{dC} = -1 \cdot -\frac{R_3}{(CR_3)^2} = \frac{1}{CR_3}$$

$$S_{R_2}^{Q} = \frac{R_2}{Q} \frac{\partial Q}{\partial R_2} = \frac{R_2}{Q} \cdot \frac{1}{R_3} = \frac{1}{Q}$$

$$Q = \frac{R_2}{R_3}$$

$$S_{R_3}^{Q} = \frac{R_3}{Q} \frac{\partial Q}{\partial R_3} = \frac{R_3}{Q} \cdot -\frac{R_2}{R_3^2} = -1$$

$$\omega_0 = \frac{1}{R_3 C}$$

BUTTERWORTH

$$|T(j\omega)|^2 = \frac{1}{1+\omega_n^{2n}} = \frac{1}{1+\omega^4}$$

$$\downarrow \quad \omega = \frac{s}{j}$$

$$\frac{1}{1+s^4}$$

YO SE QUE $Q^{-1} = 2\cos\psi$

EN NUESTRO CASO TENEMOS $\psi = \pi/4$

$$\frac{R_2}{R_3} = \frac{1}{2\cos\psi}$$

$\theta_1 = \pi/4 \quad \theta_3 = (5/4)\pi$

$\theta_2 = \frac{3\pi}{4} \quad \theta_4 = (7/4)\pi$

- COMO USO LA FUNCION NORMALIZADA

$$R_2 = \frac{1}{2\cos\psi} = \frac{\sqrt{2}}{2}$$

$$T(s) = \frac{1}{s^2 + s\frac{\sqrt{2}}{2} + 1}$$

PASA BANDA (SALIDA EN V_1)

HOJA Nº 6

FECHA

$$V_o = -V_3 \qquad V_3 = \frac{-V_1}{SCR_3}$$

$$V_o = \frac{V_1}{SCR_3}$$

$$\frac{V_i}{R_1} = -V_1 SC_1 - \frac{V_1}{R_2} - \frac{V_1}{SCR_3^2}$$

$$\frac{V_i}{R_1} = -V_1\left(SC_1 + \frac{1}{R_2} + \frac{1}{SCR_3^2}\right)$$

$$\frac{V_i}{R_1} = -V_1\left(\frac{S^2C^2R_3^2R_2 + SCR_3^2 + R_2}{SCR_3^2R_2}\right)$$

$$-\frac{SCR_3^2R_2}{R_1(S^2C^2R_3^2R_2 + SCR_3^2 + R_2)} = \frac{V_1}{V_i}$$

$$-\frac{1}{R_1}\cdot\frac{S/C}{S^2 + S\frac{1}{CR_2} + \frac{1}{C^2R_3^2}}\cdot\frac{R_2}{R_2} = \frac{V_1}{V_i}$$

$$-\underbrace{\left(\frac{R_2}{R_1}\right)}_{K}\frac{S\left(\frac{1}{CR_2}\right)\frac{\omega_0}{Q}}{S^2 + S\underbrace{\frac{1}{CR_2}}_{\frac{\omega_0}{Q}} + \underbrace{\frac{1}{C^2R_3^2}}_{\omega_0^2}} = T_{PB}(S)$$

→ PASABAJOS

Queria poner pasabanda