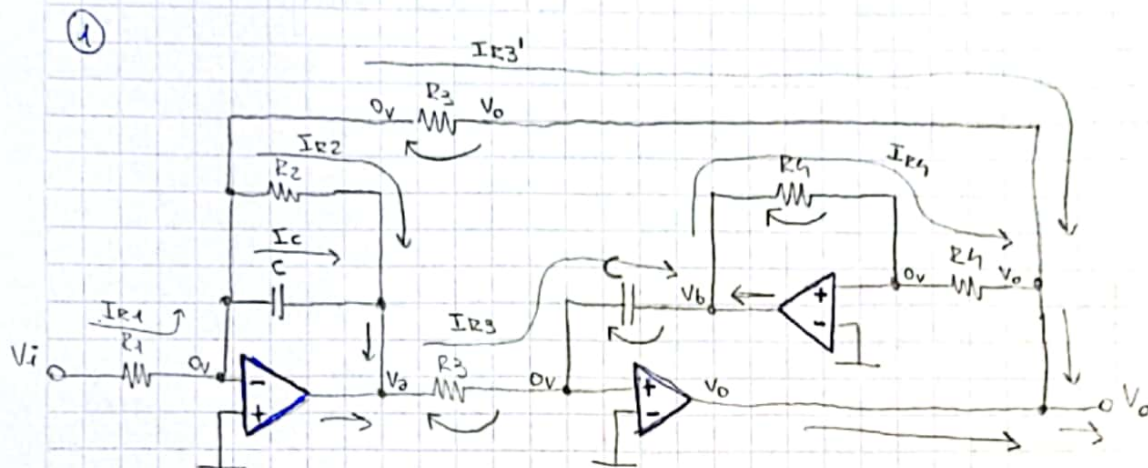


TRABAJO SEMANAL N° 2



$$I_{R4} = \frac{0V - V_0}{R_4} = -\frac{V_0}{R_4} \quad V_b = 0V + V_{R4} = I_{R4} \cdot R_4 = -V_0$$

$$V_b = -V_0$$

$$I_{R3} = \frac{0V - V_b}{\frac{1}{sC}} = V_0 \cdot sC \quad V_a = 0V + V_{R3} = I_{R3} \cdot R_3 = V_0 \cdot sC R_3$$

$$V_a = V_0 \cdot sC R_3$$

$$I_{R1} = I_{R2} + I_C + I_{R3}' \quad I_{R1} = \frac{V_i}{R_1}$$

$$I_{R2} = \frac{0V - V_a}{R_2} = -\frac{V_a}{R_2} = -V_0 \cdot \frac{sC R_3}{R_2}$$

$$I_C = \frac{0V - V_a}{\frac{1}{sC}} = -V_a \cdot sC = -V_0 \cdot s^2 C^2 R_3$$

$$I_{R3}' = \frac{0V - V_0}{R_3} = -\frac{V_0}{R_3}$$

$$\frac{V_i}{R_1} = -V_0 \cdot \frac{sC R_3}{R_2} - V_0 \cdot s^2 C^2 R_3 - \frac{V_0}{R_3}$$

$$\frac{V_i}{R_1} = -V_0 \left(\frac{sC R_3}{R_2} + s^2 C^2 R_3 + \frac{1}{R_3} \right)$$

$$\left[\frac{V_0}{V_i} = \frac{-R_2 R_3}{s^2 R_1 R_2 R_3^2 C^2 + s R_1 R_3^2 C + R_1 R_2} \right]$$

$$\left[\frac{V_0}{V_i} = -\frac{R_3}{R_1} \frac{1}{s^2 + \frac{1}{R_2 C} s + \frac{1}{R_3^2 C^2}} \right]$$

$$\omega_0^2 = \frac{1}{R_3^2 C^2} \quad \omega_0 = \frac{1}{R_3 C}$$

$$\frac{\omega_0}{Q} = \frac{1}{R_2 C} = \frac{1}{R_2 C} \Rightarrow Q = \frac{R_2}{R_3}$$

$$\left[\frac{V_0}{V_i} = -\frac{R_3}{R_1} \frac{\omega_0^2}{s^2 + \frac{\omega_0}{Q} s + \omega_0^2} \right]$$

$$\left[\omega_0 = \frac{1}{R_3 C} \right] \quad \left[Q = \frac{R_2}{R_3} \right]$$

②

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

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

$$Q = \frac{R_2}{R_3} = \frac{R_2}{10k\Omega} = 3 \quad [3R_2 = R_3]$$

$$[R_2 = 30k\Omega]$$

$$[R_3 = 10k\Omega] \quad [C = 100\mu F]$$

③

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

$$20 \log_8 \left(\frac{10k\Omega}{R_1} \right) = 20dB$$

$$\log_8 \left(\frac{10k\Omega}{R_1} \right) = 1$$

$$[10R_1 = R_3] \quad [R_1 = 1k\Omega]$$

$$\left[T(s) = -\frac{10}{s^2 + s \frac{1}{3} + 1} \right]$$

④

$$\Omega_\omega = \omega_0 \quad \left. T(s) = T(s) \right|_{s=s \cdot \omega_0} = -\frac{R_3}{R_1} \cdot \frac{\omega_0^2}{s^2 \omega_0^2 + s \frac{\omega_0^2}{Q} + \omega_0^2}$$

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

$$\omega_0^2 = 1 = \frac{1}{R_3^2 C^2} \Rightarrow \frac{1}{R_3} = C$$

$$[\Omega_2 = R_3 = 1]$$

$$[R_1 = \text{ELIJO/INDEPENDIENTE}]$$

$$[C = 1]$$

$$Q = \frac{R_2}{R_3} \Rightarrow [R_2 = Q]$$

$$[R_1 = 0,1]$$