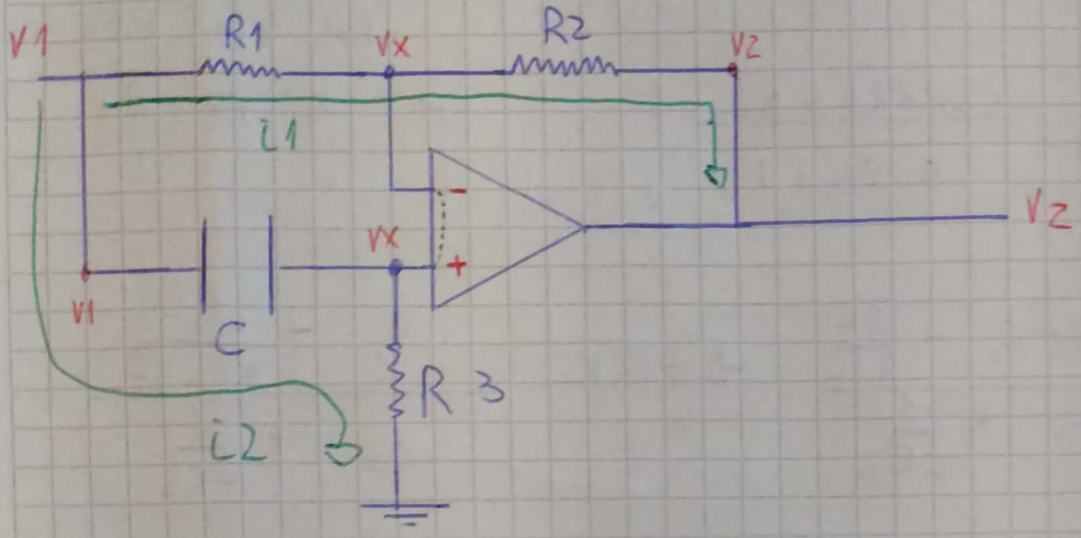
TRABAJO SEMANAL 1



1)

$T(S) = V2/V1 = ?$; $iR1(S) = iR2(S) \Rightarrow (V1 - Vx)\cdot\frac{1}{R1} = (Vx - V2)\frac{1}{R2}$

$$V1\cdot\frac{1}{R1} + \frac{1}{R2}\cdot V2 = Vx\left(\frac{1}{R1} + \frac{1}{R2}\right) \Rightarrow \frac{V1\cdot R2 + R1 V2}{\cancel{R1\cdot R2}} = \frac{R1 + R2}{\cancel{R1 R2}}\,Vx$$

$$Vx = \frac{V1\,R2 + V2\,R1}{R2 + R1} \quad (1)$$

DIVISOR DE TENSION ENTRE C Y R3

$$V_{R3} = Vx = \frac{V1\ R3}{R3 + \frac{1}{Sc}} \quad (2)$$

(1) en (2) $\rightarrow$ $\frac{V1\,R2 + V2\,R1}{R1+R2} = \frac{R3\ V1}{R3 + \frac{1}{Sc}}$

$$\frac{R1\ V2}{R1+R2} = \frac{R3\ V1}{R3 + \frac{1}{Sc}} - \frac{V1\,R2}{R1+R2} \Rightarrow \frac{R1 V2}{R1+R2} = \frac{Sc\ R3\ V1}{(Sc\,R3+1)} - \frac{R2\,V1}{(R1+R2)}$$

NOTA

$$\frac{R1\,V2}{R1+R2} = \frac{SCR3(R1+R2) - R2(SCR3+1)}{(R1+R2)(SCR3+1)}\,V1$$

POSIBLE PASA-TODO

$$T(S) = \frac{V2}{V1} = \frac{1}{R1}\,\frac{SCR3R1 - R2}{SCR3+1}$$

→ Si $R2 = R1$

$$T(S) = \frac{1}{R1}\,\frac{R1S - \frac{R2}{R3C}}{S + \frac{1}{CR3}} \rightarrow T(S) = \frac{S - \frac{R2}{R1R3C}}{S + \frac{1}{CR3}}$$

- MODULO

$$T(W) = T(S)\Big|_{S=JW} \Rightarrow T(W) = \frac{-\frac{R2}{R1R3C} + JW}{JW + \frac{1}{CR3}}$$

$$|T(W)| = \frac{\sqrt{\frac{R2^2}{R1^2R3^2C^2} + W^2}}{\sqrt{W^2 + \frac{1}{C^2R3^2}}}\cdot j$$

si $W \to 0$; $|T(W)| \to \frac{R2}{R1}$

si $W \to \infty$; $|T(W)| \to 1$

$$\theta(W) = \frac{e^{ARCTg\left(\frac{W}{-R2/(R1R3C)}\right)}}{e^{ARCTg\left(W/(1/CR3)\right)}} \rightarrow \theta(W) = ARCTg\left(\frac{-W(R1R3C)}{R2}\right) - ARCTg\left(CR3\,W\right)$$

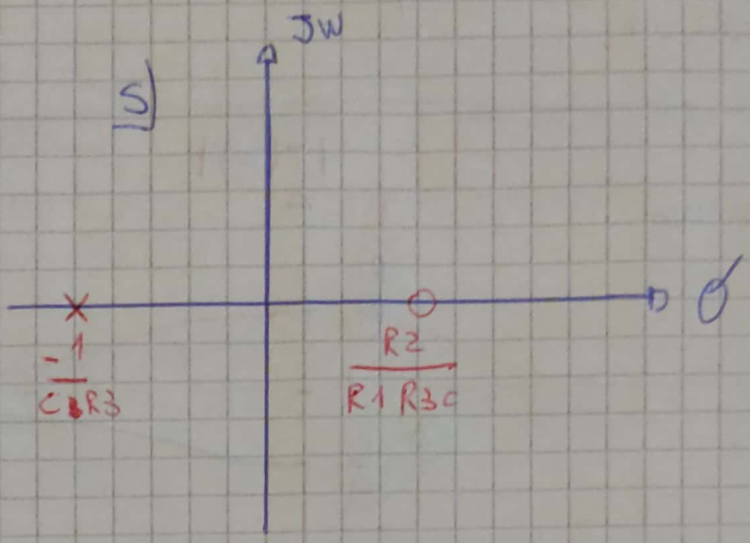
- si $W \to 0$; $\theta(W) \to 0$

si $W \to \infty$; $\theta(W) \to -\pi$

HOJA Nº

FECHA

DIAGRAMA DE POLOS Y CEROS (1 POLO Y 1 CERO)



2)

Si $w \to 0$, $|T(w)| \to \frac{R2}{R1}$ → Si R2 = R1, PASA TODO

→ ESTO ES ASI SI R2 = R1 SIN IMPORTAR LOS OTROS VALORES

3)

$$T(S) = \frac{S - (R2/R1)\,w_0}{S + w_0} \quad ; \quad w_0 = 1/(R3C)$$

$\Omega w = w_0$; $\$ = S/w_0 \to S = \$ \cdot w_0$ → TRANFERENCIA NORMALIZADA EN FRECUENCIA

$$T(\$) = \frac{\$\,w_0 - (R2/R1)\,w_0}{\$ \cdot w_0 + w_0} \Rightarrow T(\$) = \frac{\$ - R2/R1}{\$ + 1}$$

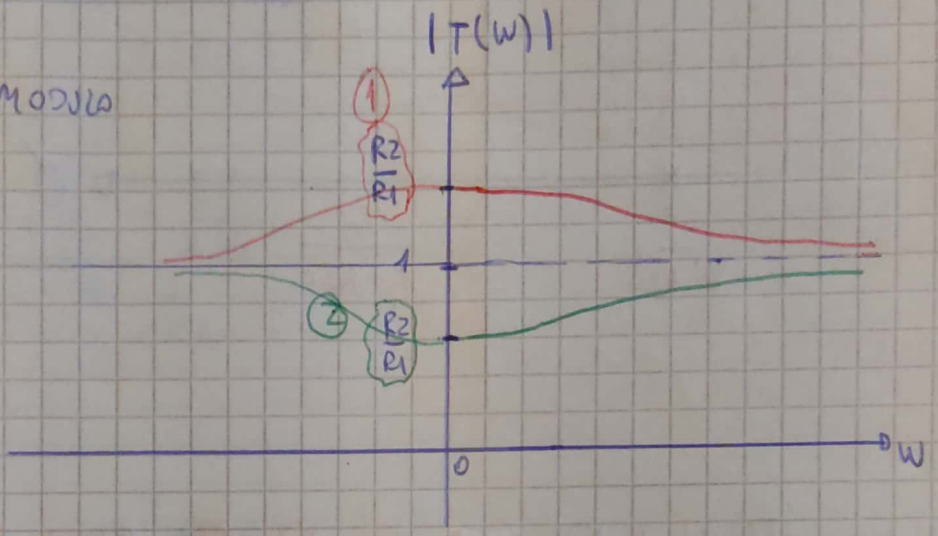
NOTA

POR IMPEDANCIA

$w_0 = \frac{1}{CR_3} \cdot CR_3 = 1 \rightarrow C = 1$;

$\Omega_3 = R_3 = 1$

GRAFICO DE MODULO



① $R_2 > R_1$

② $R_2 < R_1$

$$|T(w_0)| = \frac{\sqrt{\frac{R_1^2 + R_2^2}{R_1^2 R_3^2 C^2}}}{\sqrt{2 \cdot \left(\frac{1}{R_3 C}\right)^2}} = \frac{\sqrt{R_1^2 + R_2^2}}{R_1 R_3 C} \Big/ \sqrt{2}\,\frac{1}{R_3 C}$$

$w_0 = \frac{1}{R_3 C}$

$$|T(w_0)| = \sqrt{\frac{R_1^2 + R_2^2}{2}}$$

HOJA Nº

FECHA

5) $\frac{R2}{R1} = 1$; $R3 = 1K\Omega$; $C = 1\mu F$

$$T(S) = \frac{S - 1000}{S + 1000}$$

; $|T(w)| = 1 \rightarrow$ PASA TODO