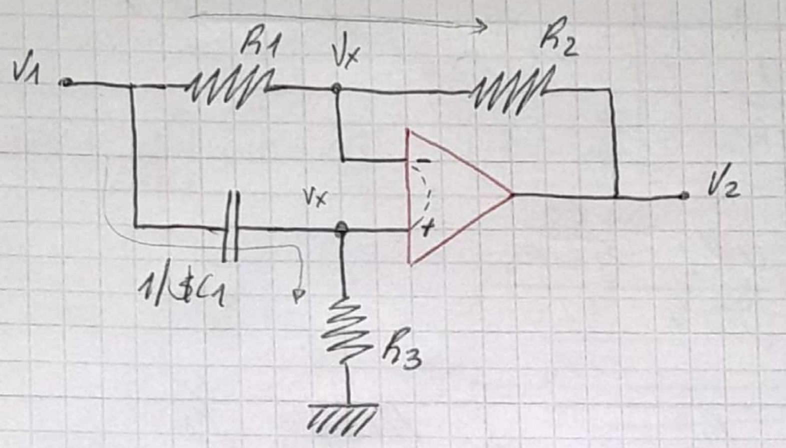
HOJA Nº

FECHA

Trabajo Semanal 1



1) $V_x \cdot (G_1+G_2) = V_1 \cdot G_1 + V_2 \cdot G_2$ (1)

$V_x \cdot (sC_1 + G_3) = V_1 \cdot sC_1$; $V_x = V_1 \cdot \dfrac{sC_1}{sC_1+G_3}$ (2)

(2) en (1) $\Rightarrow$ $V_1 \cdot \dfrac{sC_1}{sC_1+G_3} (G_1+G_2) = V_1 \cdot G_1 + V_2 \cdot G_2$

$$V_1 \cdot \left(\frac{sC_1(G_1+G_2)}{sC_1+G_3} - G_1 \right) = V_2 \cdot G_2$$

$$V_1 \cdot \frac{\cancel{sC_1G_1} + sC_1G_2 - \cancel{sC_1G_1} - G_1G_3}{sC_1+G_3} = V_2 \cdot G_2$$

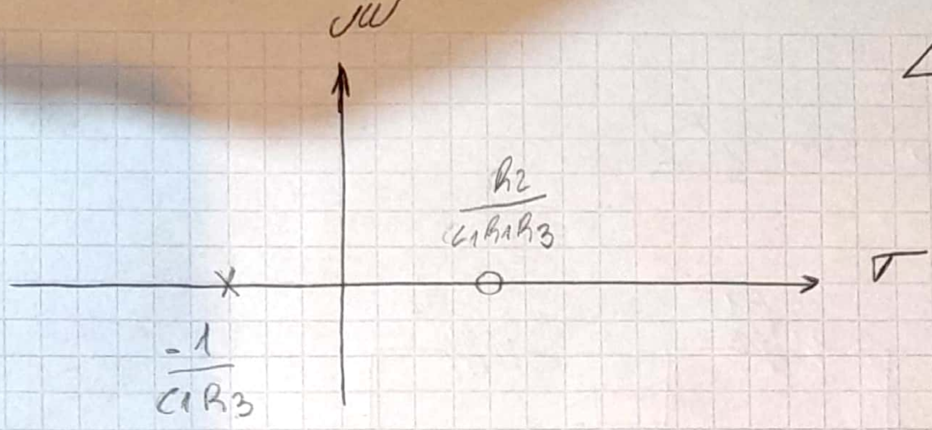
$$V_1 \cdot \frac{sC_1G_2 - G_1G_3}{sC_1+G_3} = V_2 \cdot G_2$$

$$T(s) = \frac{V_2}{V_1} = \frac{sC_1G_2 - G_1G_3}{sC_1G_2 + G_2G_3} = \frac{\cancel{C_1 \cdot G_2}}{\cancel{C_1 \cdot G_2}} \cdot \frac{s - \frac{G_1G_3}{C_1G_2}}{s + \frac{\cancel{G_2}G_3}{C_1\cancel{G_2}}}$$

$$\boxed{T(s) = \frac{s - \frac{R_2}{C_1R_1R_3}}{s + \frac{1}{C_1R_3}}}$$

NOTA

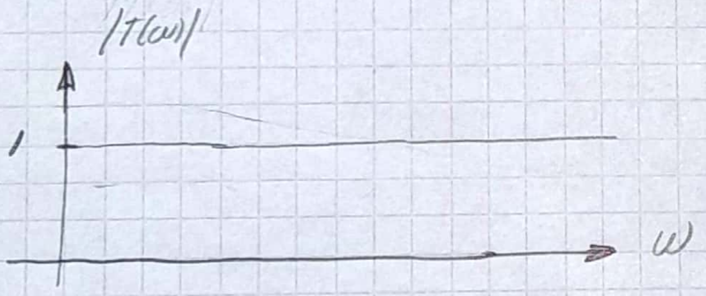
$\angle \$$



$$T(\omega) = T(\$)\Big|_{\$=j\omega} = \frac{j\omega - \frac{R_2}{C_1R_1R_3}}{j\omega + \frac{1}{C_1R_3}}$$

$$\boxed{|T(\omega)| = \frac{\sqrt{\omega^2 + \frac{R_2^2}{C_1^2R_1^2R_3^2}}}{\sqrt{\omega^2 + \frac{1}{C_1^2R_3^2}}}}$$

Si $\frac{R_2}{R_1} = 1 \Rightarrow \boxed{|T(\omega)| = 1}$



$|T(\omega)|$ es algo así. Si $R_2 = R_1$, es un pasa todo.

$$\boxed{\theta(\omega) = \arctan\left(\frac{-\omega . C_1R_1R_3}{R_2}\right) - \arctan\left(\omega . C_1R_3\right)}$$

Si $\frac{R_2}{R_1} = 1 \Rightarrow \boxed{\theta(\omega) = \varphi}$

2) Parecería ser un pasatodo y, que para baja frecuencia presenta una ganancia regulable por R_1 y R_2.

NOTA

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3) $$T(s) = \frac{s - \frac{R_2}{C_1 R_1 R_3}}{s + \frac{1}{C_1 R_3}}$$

Si $w_0 = \frac{1}{C_1 R_3} \Rightarrow T(s) = \frac{s - \frac{R_2}{R_1} \cdot w_0}{s + w_0}$

$\Omega_w = w_0$; $s = \frac{s}{\Omega_w} = \frac{s}{w_0} \Rightarrow \underline{s = s \cdot w_0}$

$\therefore T(s) = \frac{s \cdot \cancel{w_0} - \frac{R_2}{R_1} \cdot \cancel{w_0}}{s \cdot \cancel{w_0} + \cancel{w_0}}$; $\boxed{T(s) = \frac{s - R_2/R_1}{s + 1}}$ //

$\boxed{\text{La norma de frecuencia es } \Omega_w = w_0 = \frac{1}{C_1 R_3}}$ //

Circuitalmente, creo que puede tener que ver con la resonancia

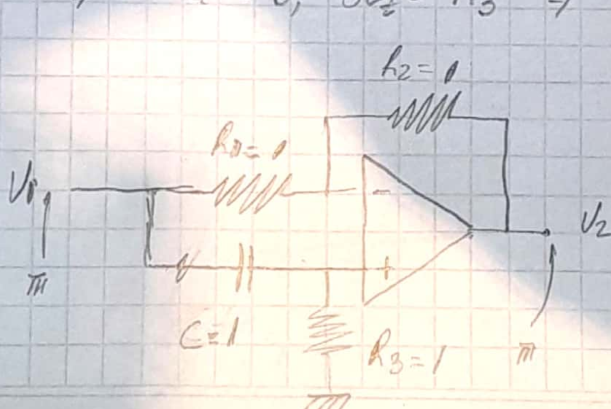
Bonus:

1) Red Normalizada.

$T(s) = \frac{s - R_2/R_1}{s+1}$, si $\frac{R_2}{R_1}$ (pasatodo) $\Rightarrow \underline{T(s) = \frac{s-1}{s+1}}$ //

Como $\Omega_w = w_0 = 1 = \frac{1}{C_1 R_3}$; $\underline{C_1 = \frac{1}{R_3}}$

Normalizando respecto a R_3, $\Omega_z = R_3 \Rightarrow \underline{C_1 = 1}$



Todos los componentes valen 1

NOTA