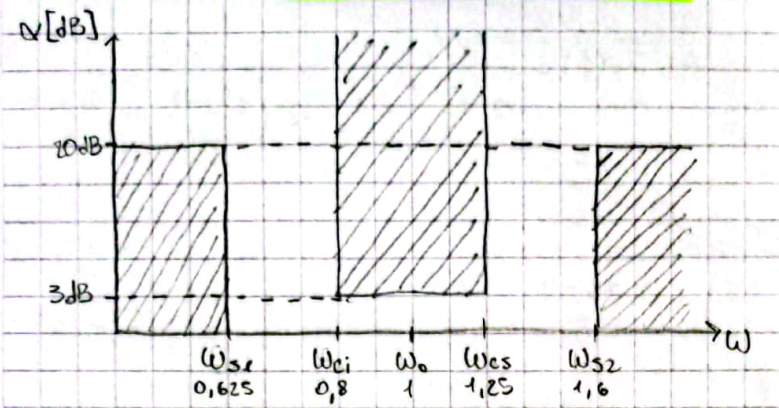
HOJA Nº

FECHA

Tarea semanal 4 Bis



$F_{ci} = 1600kHz$ $\omega_{si} = 2\pi F_{ci}$

$F_{cs} = 2500kHz$ $\omega_{cs} = 2\pi F_{cs}$

$F_{s1} = 1250kHz$ $\omega_{s1} = 2\pi F_{s1}$

$F_{s2} = 3200kHz$ $\omega_{s2} = 2\pi F_{s2}$

$\omega_0 = 4000\pi$

TRANSFORMACIÓN A PASA BAJOS

$$K(\$) = Q\,\frac{\omega^2 - 1}{\omega} \qquad Q = \frac{\omega_0}{BW} = \frac{2\pi\sqrt{F_{ci}\cdot F_{cs}}}{2\pi(F_{cs}-F_{ci})} = \frac{2.10^6}{0,9.10^6} = 2,22$$

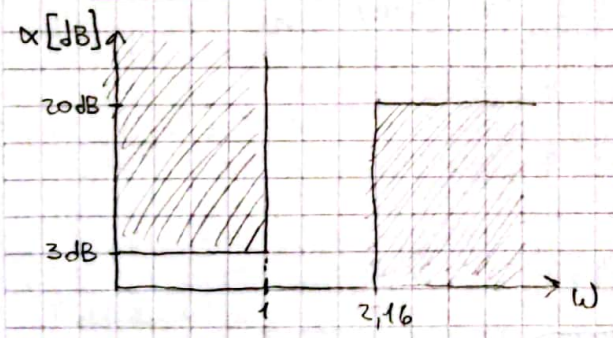
$\Omega_p = 1$

$$\Omega_{s1} = \frac{\omega_{s1}^2 - 1}{\omega_{s1}}\,Q = 2,16$$

$$\Omega_{s2} = \frac{\omega_{s2}^2 - 1}{\omega_{s2}}\,Q = 2,16$$

} Puedo usar cualquiera

PLANTILLA PASA BAJOS

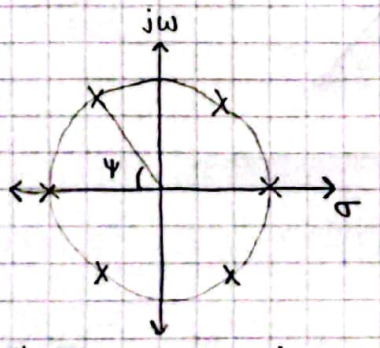


- $\xi = 1$ por condición de 3dB
- $\alpha_{min} = 10\log_{10}(1 + \xi^2\,\Omega_s^{2n})$

→ $n = 2$ → $\alpha_{min} = 13,57\,dB$ ✗

→ $\boxed{n = 3}$ → $\alpha_{min} = 20,11\,dB$ ✓

$$|T(\$)| = \frac{1}{1 - \$^6} \longrightarrow T_3(\$) = \frac{1}{\$ + 1}\,\frac{1}{\$^2 + \$ + 1}$$



$\Psi = \pi/3$ $\qquad Q = \frac{1}{\cos\Psi.2} = 1$

$\cos\Psi = \frac{1}{2}$

NOTA

APLICO TRANSFORMACIÓN

$$\$ \longrightarrow \frac{\$^2 + 1}{\$ Q}$$

$$T_3(\$) = \frac{1}{\$ + 1} \quad \frac{1}{\$^2 + \$ + 1} \longrightarrow T_3(\$) = \frac{1}{Q\frac{\$^2+1}{\$} + 1} \quad \frac{1}{Q^2\left(\frac{\$^2+1}{\$}\right)^2 + Q\frac{\$^2+1}{\$} + 1}$$

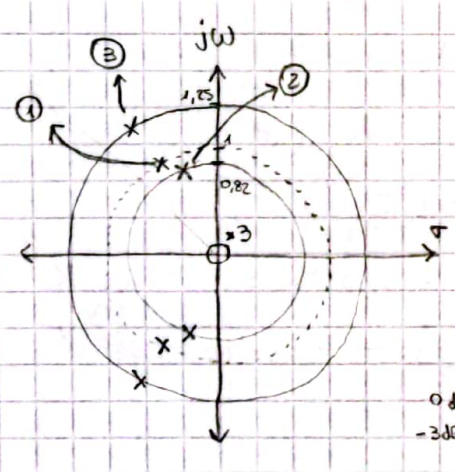
$$T_3(\$) = \frac{\$}{Q\$^2 + \$ + Q} \quad \frac{1}{Q^2\left(\frac{\$^4 + 2\$^2 + 1}{\$^2}\right) + Q\frac{\$^2+1}{\$} + 1}$$

$$= \frac{\$/Q}{\$^2 + \$/Q + 1} \quad \frac{\$^2}{Q^2\$^4 + 2Q^2\$^2 + Q^2 + Q\$^3 + Q\$ + \$^2}$$

$$= \frac{\$/Q}{\$^2 + \$/Q + 1} \quad \frac{\$^2/Q^2}{\$^4 + \$^3/Q + \$^2\left(2 + \frac{1}{Q^2}\right) + \$/Q + 1}$$

CON AYUDA DE SIMULACIÓN SEPARO EN SOS

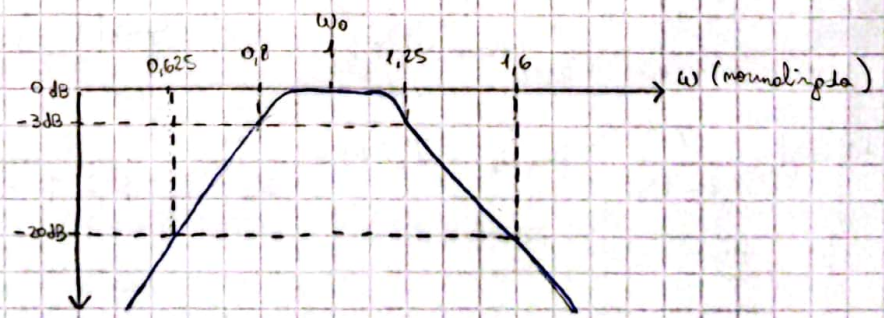
$$\left[T_3(\$) = \underset{①}{\frac{\$\,0{,}45}{\$^2 + \$\,0{,}45 + 1}} \quad \underset{②}{\frac{\$\,0{,}45}{\$^2 + \$\,0{,}18 + 0{,}697}} \quad \underset{③}{\frac{\$\,0{,}45}{\$^2 + \$\,0{,}268 + 1{,}477}}\right]$$

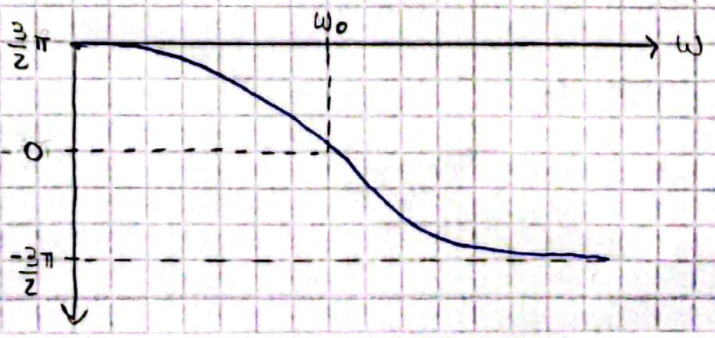


① $\omega_0 = 1 \quad \Psi = \arccos\left(\frac{\omega_0}{2Q}\right) = 77°$

② $\omega_0 = 0{,}82 \quad \Psi = 79{,}37°$

③ $\omega_0 = 1{,}215 \quad \Psi = 74{,}13$





NOTA

HOJA N°

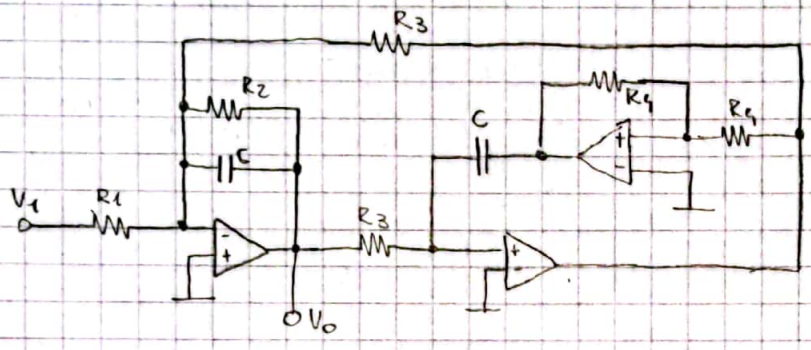
FECHA

IMPLEMENTACIÓN ACK-MOSS

$$T_{ack}(\$) = \frac{\$\,\frac{\omega_0}{Q}\,k}{\$^2 + \$\,\frac{\omega_0}{Q} + \omega_0^2} \qquad K = -\frac{R_2}{R_1} \qquad Q = \frac{R_2}{R_3}$$

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

Se utilizarán 3 de los siguientes circuitos de ACK-MOSS en cascada



Mi transferencia es:

$$T(\$) = \frac{\$\,0{,}45}{\$^2 + \$\,0{,}45 + 1} \qquad \frac{\$\,0{,}18 \cdot 2{,}5}{\$^2 + \$\,0{,}18 + 0{,}677} \qquad \frac{\$\,0{,}268 \cdot 1{,}68}{\$^2 + \$\,0{,}268 + 1{,}477}$$

① ② ③

① $\frac{1}{R_3 C} = 1$ → $R_3 = 1$, $C = 1$; $\frac{R_3}{R_2} = 0{,}45 \rightarrow R_2 = 2{,}22$; $\frac{R_2}{R_1} = 1 \rightarrow R_1 = R_2$

② $\frac{1}{R_3 C} = \sqrt{0{,}677}$ → $R_3 = 1$, $C = 1{,}215\,F$; $\frac{\sqrt{0{,}677}}{R_2/R_3} = 0{,}18 \rightarrow R_2 = 4{,}57$; $\frac{R_2}{R_1} = 2{,}5 \rightarrow R_1 = 1{,}83$

③ $\frac{1}{R_3 C} = \sqrt{1{,}477}$ → $R_3 = 1$, $C = 0{,}823\,F$; $\frac{\sqrt{1{,}477}}{R_2/R_3} = 0{,}268 \rightarrow R_2 = 1{,}53$; $\frac{R_2}{R_1} = 1{,}68 \rightarrow R_1 = 2{,}7$

NOTA