

6) $\omega_1 = 25 \text{ Krad/s}$ $\omega_2 = 10 \text{ K}$ $\tau = 100 \mu\text{s}$ $R_w = \frac{1}{100 \mu\text{s}} = 10 \text{ K}$
 $\rightarrow \omega_1 = 2,5$ $\omega_2 = 1$ Retardo max = 10% = 0% $\alpha_{\text{max}} = 7 \text{ dB}$

De la primer gráf. w : $m=4$ de la segunda $m=3$

Filtro Bessel de orden 4: $H(s) =$

$$\text{Cálculo } H(s) = \frac{1}{s} + \frac{1}{\frac{3}{s} + \frac{1}{\frac{5}{s} + \frac{1}{s}}} = \frac{1}{s} + \frac{1}{\frac{3}{s} + \frac{5.7}{s^2 + 35}}$$

$$= \frac{1}{s} + \frac{s^2 + 35}{10s^2 + 105} = \frac{5s^4 + 5s^2 + 45 + 105}{70s^3 + 705s}$$

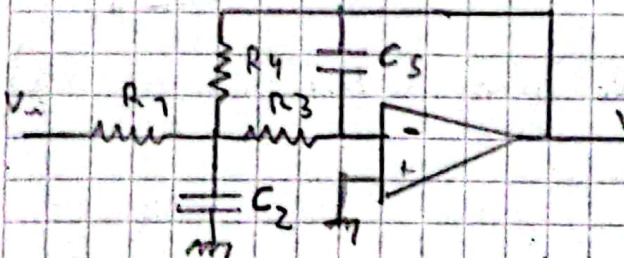
$$H(s) = \frac{105}{5s^4 + 10s^3 + 45s^2 + 105s + 105}$$

Polos: $X_{1,2} = -2,103 \pm j2,657$ $X_{3,4} = -2,896 \pm j0,667$

$$H(s) = \frac{11,48}{(s^2 + s \cdot 4,206 + 11,48)} \cdot \frac{9,138}{(s^2 + s \cdot 5,85 + 9,138)} = 105$$

$K_1 = K_2 = 1$ $\omega_1 = 3,38$ $\omega_2 = 3,02$ $Q_1 = 0,803$ $Q_2 = 0,516$

Diseño con MFB: $H(s) = \frac{-R_1 R_3 C_2 C_5}{s^2 \left(\frac{1}{R_1} + \frac{1}{R_3} + \frac{1}{R_4} \right) C_2 + \frac{1}{R_3 R_4 C_2 C_5}}$



$K = \frac{R_4}{R_1} = 1$ $\omega_0 = \frac{1}{\sqrt{R_3 R_4 C_2 C_5}}$

$Q = \frac{1}{\sqrt{\frac{R_4 C_5}{R_3 C_2}} + \sqrt{\frac{R_3 C_5}{R_4 C_2}} + \frac{1}{R_1} \sqrt{\frac{R_3 R_4 C_5}{C_2}}}$

Con $R = 1 = R_1 = R_3 = R_4$

$\omega_0 = \frac{1}{\sqrt{C_2 C_5}}$ $Q = \frac{1}{3} \sqrt{\frac{C_2}{C_5}}$

Para H_1 : $\omega_0^2 = 11,48 = \frac{1}{C_2 C_5} \rightarrow C_2 = \frac{1}{11,48 C_5}$

$3 \cdot 4,206 = \sqrt{\frac{1}{C_5^2 \cdot 11,48}} \rightarrow C_5 = 23,4 \mu\text{F}$ $C_2 = 3,72 \text{ F}$

Para H_2 :

$C_2 = \frac{1}{9,138 C_5}$ $C_5 = \frac{1}{3,85 \cdot 3,02} = 18,86 \mu\text{F}$

$C_2 = 5,8 \text{ F}$