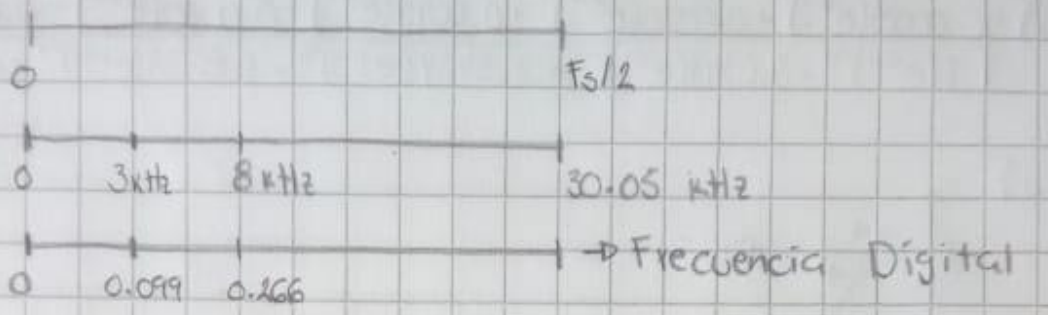
- Filtro Butterworth
- F_S = 60.1 kHz
- F_P = 3.0 kHz
- F_s = 8.0 kHz
- D_P = 3dB
- D_S = 25 dB

→ Frecuencia Analógica



$\omega_P = \frac{3}{30.05} = 0.099$ $\omega_S = \frac{8}{30.05} = 0.2666$

→ Se ingresa a Matlab

[N, W_N] = buttord (W_P, W_S, R_P, R_S)

[N, W_N] = buttord (0.099, 0.266, 1, 30) → N = 4

W_N = 0.1179

→ Diseño del filtro

[B, A] = butter (N, W_N) → B =

[B, A] = butter (4, 0.1179)

B = 0.0008 0.0030 0.0045 0.0030 0.0008

A = 1.0000 -3.0393 3.5424 -1.8753 0.3772

$$H(z) = \left| \frac{0.0008z^{-4} + 0.0030z^{-3} + 0.0045z^{-2} + 0.0030z^{-1} + 0.0008}{1z^{-4} - 3.0343z^{-3} + 3.6424z^{-2} - 1.8733z^{-1} + 0.3772} \right|$$

- $z = e^{j\omega}$

$$H(\omega) = \left| \frac{0.0008(e^{j\omega})^{-4} + 0.0030(e^{j\omega})^{-3} + 0.0045(e^{j\omega})^{-2} + 0.0030(e^{j\omega})^{-1} + 0.0008}{1(e^{j\omega})^{-4} - 3.0343(e^{j\omega})^{-3} + 3.5424(e^{j\omega})^{-2} - 1.8733(e^{j\omega})^{-1} + 0.3772} \right|$$

$H(\omega)$