

Calculos NeuroTechArm

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1 Diseño filtro pasa-bajo

Condiciones deseadas para un filtro pasa-bajo:

1. $20\log|H(j\Omega)| \leq K2$ para $\Omega \leq \Omega_1$ e $\Omega \geq \Omega_2$
2. $20\log|H(j\Omega)| \leq K1$ para $\Omega_1 \leq \Omega \leq \Omega_u$

2 Calculos Pasa bajo:

$$dB = 20\log_{10}\left(\frac{V}{V_{ref}}\right)$$

Para un rango de 0.1 mV a 5 mV

$$0.1mV = 20\log_{10}\left(\frac{0.1}{1}\right) = -20dB$$

$$5mV = 20\log_{10}\left(\frac{5}{1}\right) = 14dB$$

Utilizando la formula:

$$10\log_{10}|H(j\Omega)|^2 = K1$$

$$10\log_{10}\left(\frac{1}{1+(\frac{\Omega_1}{\Omega_c})^{2n}}\right) = K1$$

Entonces:

$$10\log_{10}\left(\frac{1}{1+(\frac{400Hz}{\Omega_c})^{2(4)}}\right) = -20dB$$

$$\Omega_c = -225.2$$

3 Calculos Pasa alto:

$$dB = 20\log_{10}\left(\frac{V}{V_{ref}}\right)$$

Para un rango de 0.1 mV a 5 mV

$$0.1mV = 20\log_{10}\left(\frac{0.1}{1}\right) = -20dB$$

$$5mV = 20\log_{10}\left(\frac{5}{1}\right) = 14dB$$

Utilizando la formula:

$$10\log_{10}|H(j\Omega)|^2 = K1$$

$$10\log_{10}\left(\frac{1}{1+(\frac{\Omega}{\Omega_c})^{2n}}\right) = K1$$

Entonces:

$$10\log_{10}\left(\frac{1}{1+(\frac{20Hz}{\Omega_c})^{2(4)}}\right) = -20dB$$

$$\Omega_c = -11.2$$

4 Frecuencia de muestreo:

Aplicando el teorema de Nyquist:

$$fmuestreo = 2(fmax)$$

$$fmuestreo = 2(500)$$

$$fmuestreo = 1000Hz$$