Ejercicio #3 Guía Filtros digitales

ⓐ Filtro Media Movil

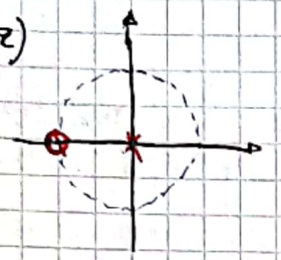
$h_1(k) = (1, 1) \longrightarrow y(k) = x(k) + x(k-1)$

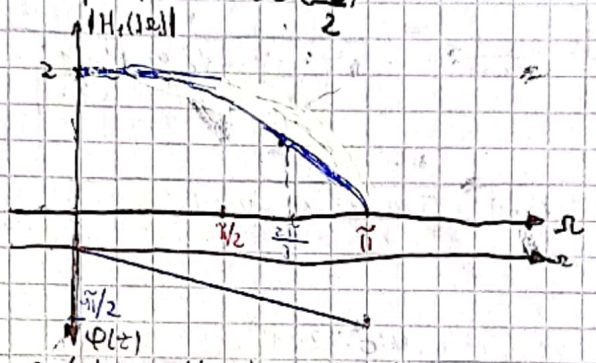
$Y(z) = X(z) \cdot (1 + z^{-1}) \Rightarrow H_1(z) = \frac{Y(z)}{X(z)} = \frac{z+1}{z}$

$H_1(j\Omega) = (1 + e^{-j\Omega}) = e^{-j\Omega/2}(e^{-j\Omega/2} + e^{j\Omega/2})$

$H_1(j\Omega) = 2\cos\left(\frac{\Omega}{2}\right) \cdot e^{j\Omega/2}$

z)





$h_2(k) = [1, 1, 1] \Rightarrow Y_2(k) = x(k) + x(k-1) + x(k-2)$

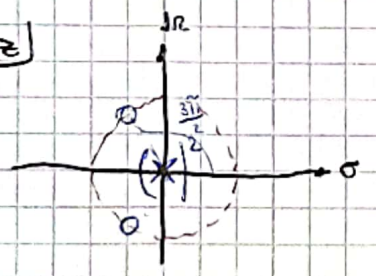
$Y_2(z) = X(z)\left(1 + z^{-1} + z^{-2}\right) \Rightarrow H_2(z) = \frac{Y_2(z)}{X(z)} = \left(1 + z^{-1} + z^{-2}\right)$

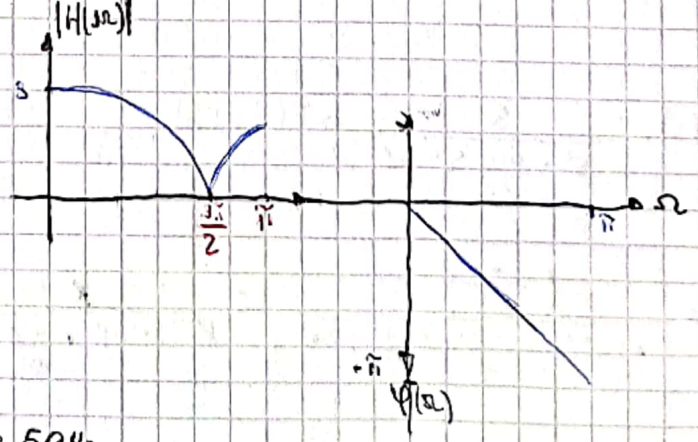
$H_2(z) = \frac{z^2 + z + 1}{z^2}$

$H_2(j\Omega) = \left(1 + e^{-j\Omega} + e^{-j2\Omega}\right) = e^{-j\Omega} \cdot \left(e^{j\Omega} + e^{-j\Omega} + 1\right)$

$H_2(j\Omega) = e^{-j\Omega}(2\cos(\Omega) + 1)$

z)





Para Filtro senoidal de 50Hz

$|H(j\Omega)|_{\Omega = 2\pi \cdot 50Hz} = 0 \Rightarrow \left[F_s = \frac{50Hz \cdot \pi}{\frac{3\pi}{2}} = \frac{100}{3}\ Hz\right]$