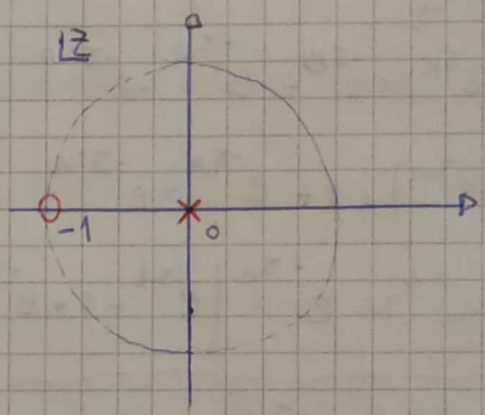
3)

a) CASO 1

$h_1(K) = (1, 1)$; $h(0) = 1$; $h(1) = 1$

$\rightarrow H_1(z) = 1 + z^{-1} \Rightarrow \boxed{H_1(z) = \frac{z+1}{z}}$

DIAGRAMA DE POLOS Y CEROS

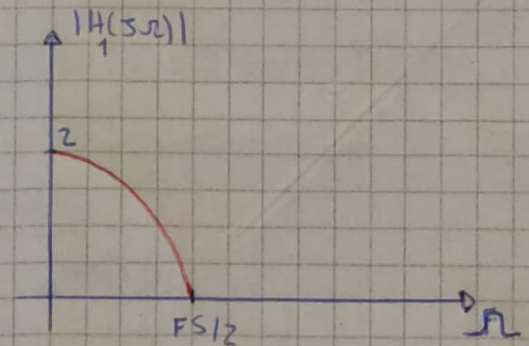


$H_1(j\Omega) = H(z)\Big|_{z=1e^{j\Omega}} = e^{j0} + e^{-j\Omega}$

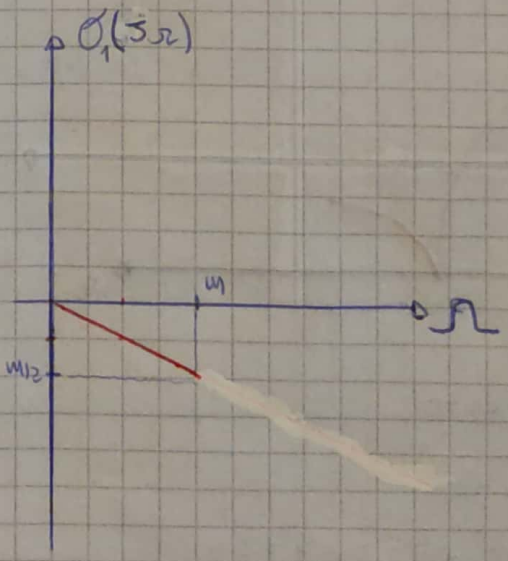
$H_1(j\Omega) = e^{-j\Omega} + 1 = e^{-j\Omega/2}\left(e^{j\Omega/2} + e^{-j\Omega/2}\right) \cdot \frac{2}{2}$

$\boxed{H_1(j\Omega) = 2 \cdot \cos(\Omega/2)\, e^{-j\Omega/2}}$

MODULO



FASE



CASO 2:

$h_2(k) = (1, 1, 1)$

↳ $H_2(z) = 1 + z^{-\Omega} + z^{-2\Omega} \rightarrow H_2(z) = \dfrac{z^2 + z + 1}{z^2}$

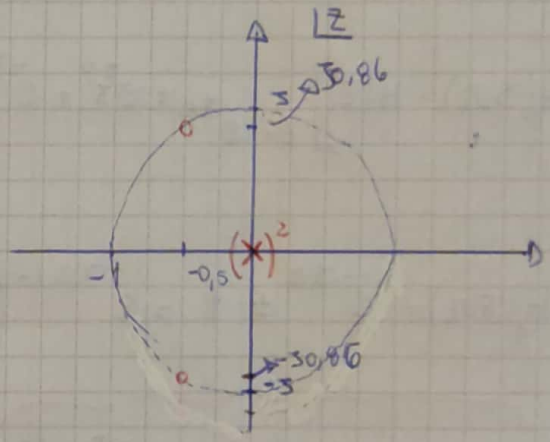
$H_2(e^{j\Omega}) = e^{-j0\Omega} + e^{-j\Omega} + e^{-j2\Omega}$

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

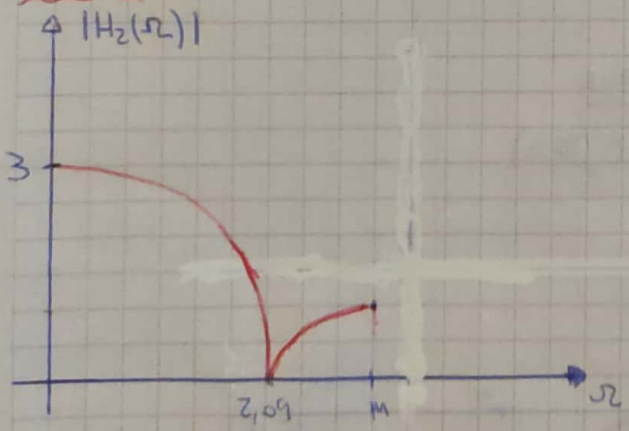
$H_2(e^{j\Omega}) = e^{-j\Omega}\left(e^{j\Omega} + 1 + e^{-j\Omega}\right) \cdot \frac{2}{2}$

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

DIAGRAMA DE POLOS Y CEROS



MODULO



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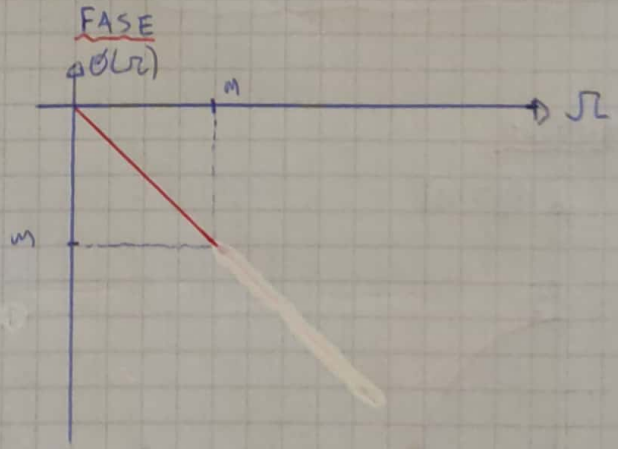


$2\cos(\Omega) + 1 = 0$

$\cos\Omega = -1/2$

$\Omega = 120° \rightarrow \Omega \cong 2,09 = \frac{2}{3}\pi$

$|2\cos(\pi) + 1| = 1$

NOTA

1) PARA PODER REPRESENTAR LA MEDIA, SE DEBERIA DIVIDIR A CADA TERMINO, POR LA CANTIDAD DE MUESTRAS.

2) $\frac{2}{3}m \rightarrow$ HAY UN 0 ; OSEA EN $\frac{FS}{3}$; SI QUEREMOS ELIMINAR 50HZ, FS = 150HZ

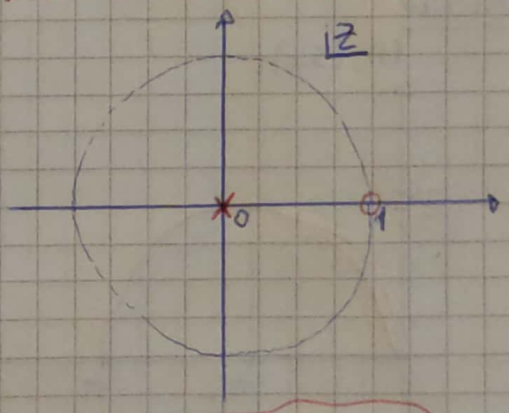
ENTONCES FS = 150HZ

CASO 1:

SI $h_1(k) = (1; -1)$ DE PRIMER ORDEN

$H_1(z) = 1 - z^{-1} \rightarrow H_1(z) = \frac{z-1}{z}$

DIAGRAMA DE POLOS Y CEROS

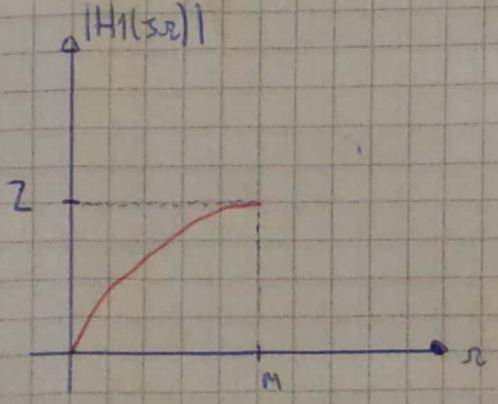


$H_1(j\Omega) = e^{-j\Omega} - e^{-j\Omega}$

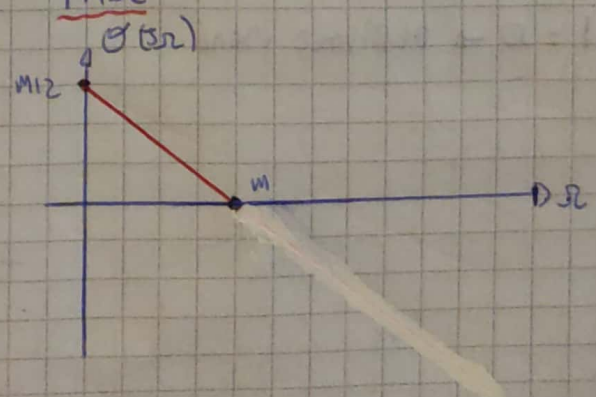
$H_1(j\Omega) = e^{-j\Omega/2}\left(e^{j\Omega/2} - e^{-j\Omega/2}\right).2j/2j$

$H_1(j\Omega) = 2j\,\mathrm{sen}(\Omega/2)\, e^{-j\Omega/2} \rightarrow H_1(j\Omega) = 2\,\mathrm{sen}(\Omega/2)\, e^{-j(\Omega/2 - \pi/2)}$

MODULO



FASE

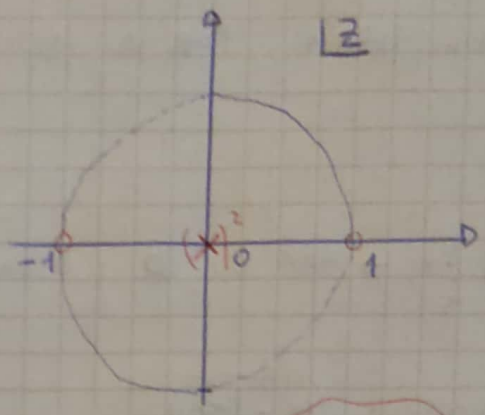


CASO 2:

$h_2(k) = (1, 0, -1)$

DIAGRAMA DE POLOS Y CEROS

$H_2(z) = 1 - z^{-2} \rightarrow H_2(z) = \frac{z^2 - 1}{z^2}$;



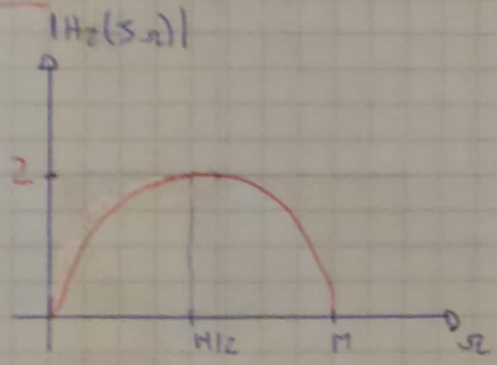
$H_2(5\Omega) = e^{-5\Omega} - e^{-5 \cdot 2\Omega}$

$H_2(5\varepsilon) = 1 - e^{-5 \cdot 2\Omega}$

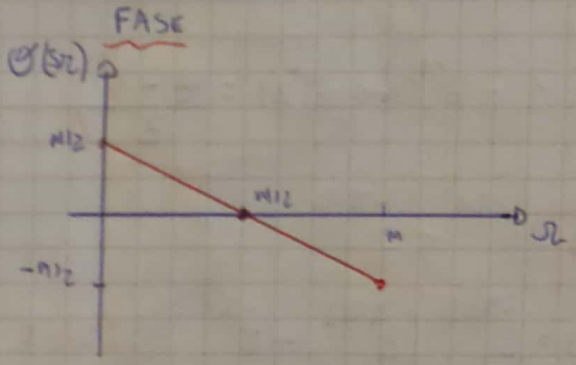
$H_2(5\varepsilon) = e^{-5\Omega}\left(e^{5\Omega} - e^{-5\Omega}\right)\frac{2^5}{2^5} \rightarrow A_2(5\Omega) = 2^5 \operatorname{sen}(\Omega)\, e^{-5\Omega}$

$\hookrightarrow e^{5\pi/2}$

MODULO



FASE



1) CASO 1: UNA DEMORA DE 1/2
CASO 2: " " " 1
} $\frac{d\theta(\Omega)}{dt}$ → RETARDO DE GRUPO

2) $|H(\Omega)| = \Omega \rightarrow$ DERIVADOR IDEAL