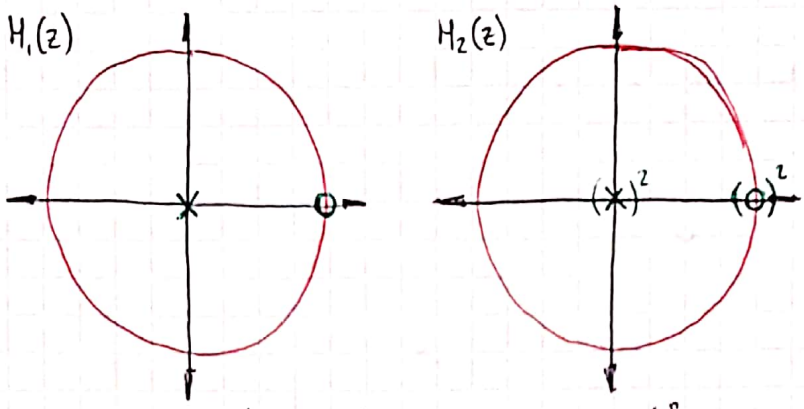
b) $h_1(k) = (1, -1) \Rightarrow H_1(z) = 1 - z^{-1} = \frac{z-1}{z}$

$h_2(k) = (1; 0; -1) \Rightarrow H_2(z) = 1 - z^{-2} = \frac{z^2-1}{z^2}$

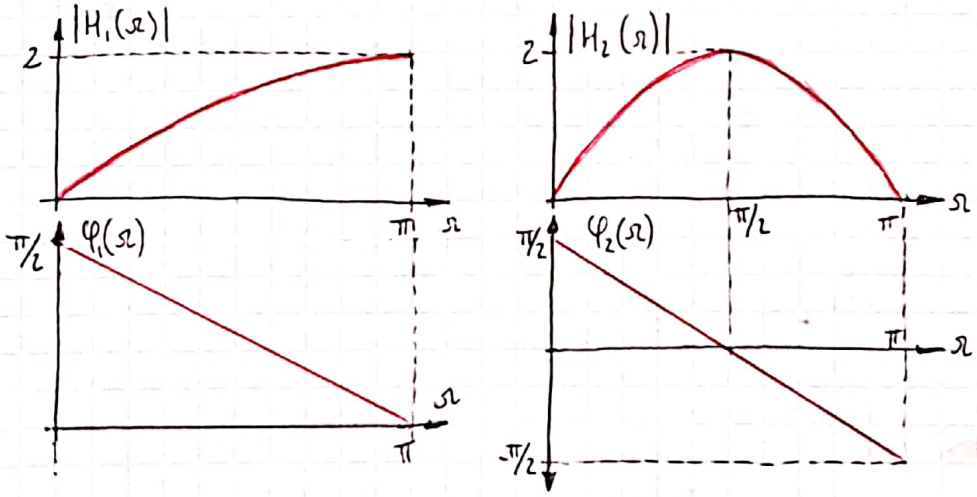


- $H_1(e^{j\Omega}) = 1 - e^{-j\Omega} = e^{-j\frac{\Omega}{2}}\left(e^{j\frac{\pi}{2}} - e^{-j\frac{\Omega}{2}}\right) = e^{-j\frac{\Omega}{2}}\, j2\,\mathrm{sen}(\Omega/2) = e^{j\left(\frac{\pi}{2}-\frac{\Omega}{2}\right)} 2\,\mathrm{sen}(\Omega/2)$

  $\rightarrow |H_1(\Omega)| = 2\,|\mathrm{sen}(\Omega/2)|$; $\varphi_1(\Omega) = \frac{\pi}{2} - \frac{\Omega}{2}$

- $H_2(e^{j\Omega}) = 1 - e^{-j2\Omega} = e^{-j\Omega}\left(e^{j\Omega} - e^{-j\Omega}\right) = e^{-j\Omega}\, j2\,\mathrm{sen}(\Omega) = e^{j\left(\frac{\pi}{2}-\Omega\right)} 2\,\mathrm{sen}(\Omega)$

  $\rightarrow |H_2(\Omega)| = 2\,|\mathrm{sen}(\Omega)|$; $\varphi_2(\Omega) = \frac{\pi}{2} - \Omega$



(1) $H_1(z)$ introduce una demora $\tau_{e_1}(\Omega) = -\frac{\delta\varphi_1(\Omega)}{\delta\Omega} = 1/2$

$H_2(z)$ introduce una demora $\tau_{e_2}(\Omega) = -\frac{\delta\varphi_2(\Omega)}{\delta\Omega} = 1$

(2) $0{,}95 \leq \frac{|H_1(\Omega)|}{\Omega} \leq 1{,}05$

$0{,}95 \leq \frac{2\,\mathrm{sen}(\Omega/2)}{\Omega} \leq 1{,}05$

$\frac{2\,\mathrm{sen}(\Omega/2)}{\Omega} \leq 1 \quad \forall\ \Omega \in [0;\pi)$

$\hookrightarrow \frac{2\,\mathrm{sen}(\Omega/2)}{\Omega} \geq 0{,}95 \rightarrow \Omega \leq 1{,}10382$

$0{,}95 \leq \frac{|H_2(\Omega)|}{\Omega} \leq 1{,}05$

$0{,}95 \leq \frac{2\,\mathrm{sen}(\Omega)}{\Omega} \leq 1{,}05$

$0{,}475 \leq \frac{\mathrm{sen}(\Omega)}{\Omega} \leq 0{,}525$

$\hookrightarrow 1{,}8375 \leq \Omega \leq 1{,}9552$

VALORES HALLADOS MEDIANTE ITERACIONES