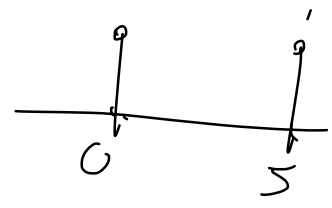
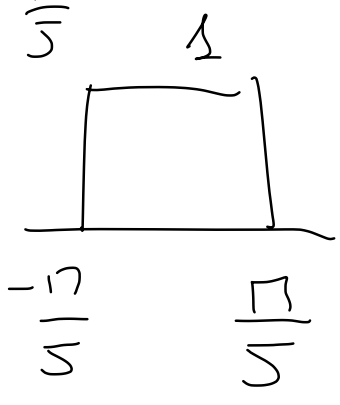
EXAMEN FINAL ASS JUNIO 2021

a)

$$X[n] = \frac{\operatorname{sen}\left(\frac{\pi}{5}n\right)}{\frac{\pi}{5}\cdot n}$$

$$z[n] = \delta[n] + \delta[n-5]$$





→ Por 2n

$$z[n] = 1 + e^{-j5\Omega}$$

$$X[n] = u\left[n+\frac{\pi}{5}\right] - u\left[n-\frac{\pi}{5}\right]$$

b) Energía de $x[n]$

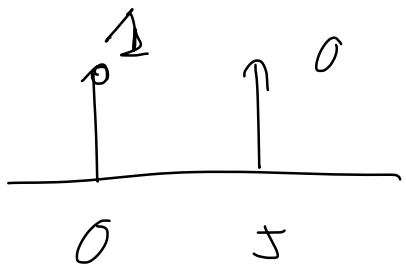
$$E = \int_{-\infty}^{\infty} |X(t)|^2 dt = \frac{1}{2\pi} \int_{\langle N \rangle} \left|X(e^{j\Omega})\right|^2 d\Omega$$

$$\frac{1}{2\pi} 1^2 \int_{-\frac{\pi}{5}}^{\frac{\pi}{5}} \Omega \, d\Omega = \frac{1}{2\pi} \Omega \Big]_{-\frac{\pi}{5}}^{\frac{\pi}{5}} = \frac{1}{5}$$

c) Energía de $z[n]$

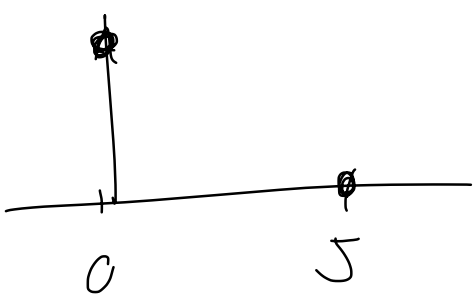
$$E = \sum_{n=-\infty}^{\infty} |X[n]|^2 = 1^2 + 1^2 = 2$$

d) Energía de $y[n] = x[n] \cdot z[n]$



$$\frac{\operatorname{Sa}\left(\frac{\pi}{5} \cdot 0\right)}{\frac{\pi}{5} \cdot 0} = \frac{0}{0}$$ ↑ L'H

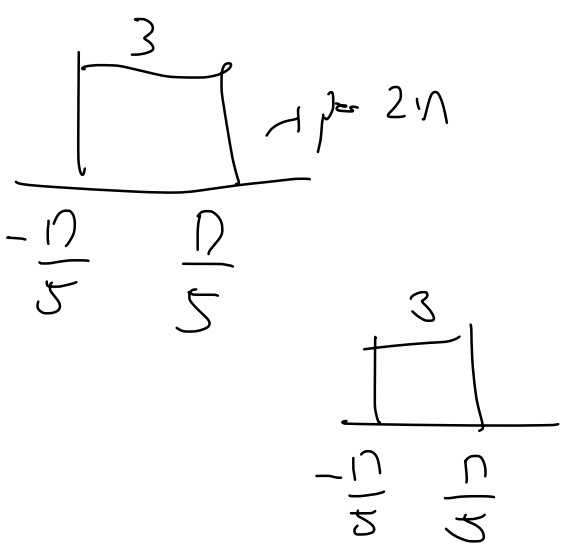
$$\frac{\frac{d}{dn}\left(\frac{\pi}{5} n\right) \cdot \frac{\pi}{5}}{\pi/5} = 1$$



$$\frac{\operatorname{Sa}\left(\frac{\pi}{5} \cdot 5\right)}{\frac{\pi}{5} \cdot 5} = \frac{0}{\pi} = 0$$

$$E = \sum_{n=-\infty}^{\infty} |x[n]|^2 = 1^2 = 1 \;//$$

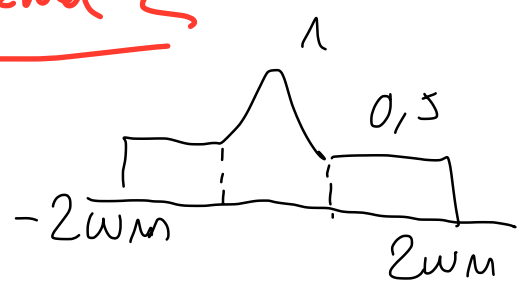
e) $3x[n] * z^2[n]$



$$x[n] = 3\left(u[n + \tfrac{\pi}{5}] - u[n - \tfrac{\pi}{5}]\right)$$

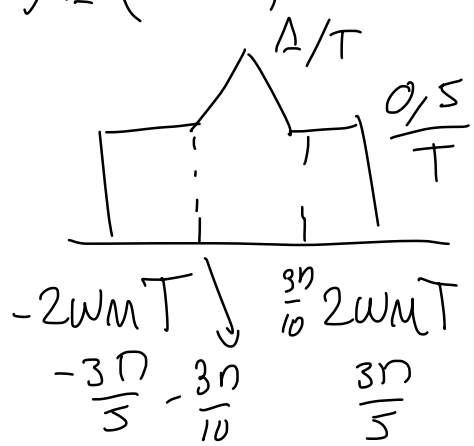
$$TF = 3M[\Omega + \tfrac{17}{5}] - 3M(\Omega - \tfrac{17}{5}) + \left(3M[\Omega + \tfrac{17}{5}] - 3M(\Omega - \tfrac{17}{5})\right)e^{-j5\Omega}$$

Problema 2



$\omega_M = 300\pi$ rad/seg

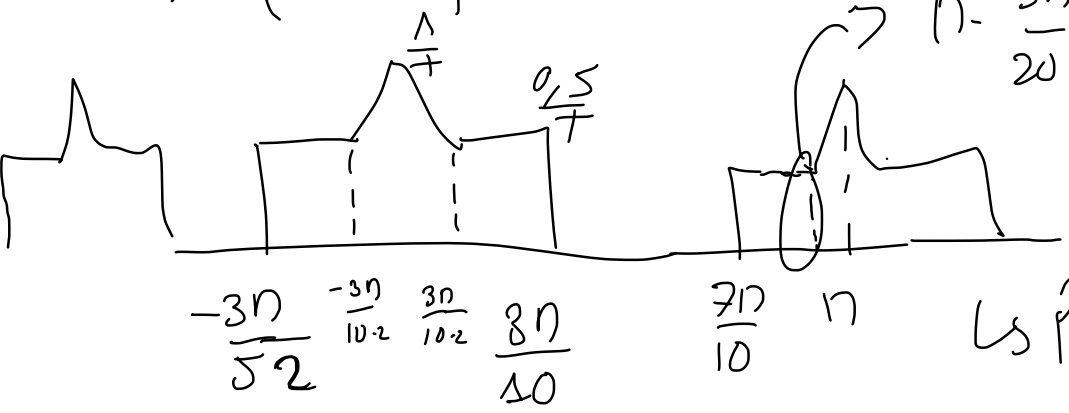
a) $X_1(e^{j\Omega})$



$2\omega_M \cdot T = 2 \cdot 300\pi \cdot 10^{-3} = \frac{3\pi}{5}$

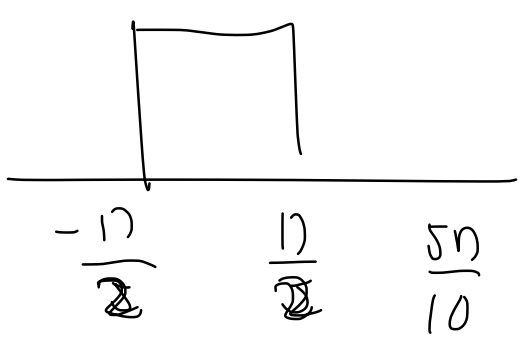
$\frac{3\pi}{5} < \pi$ No hay solape

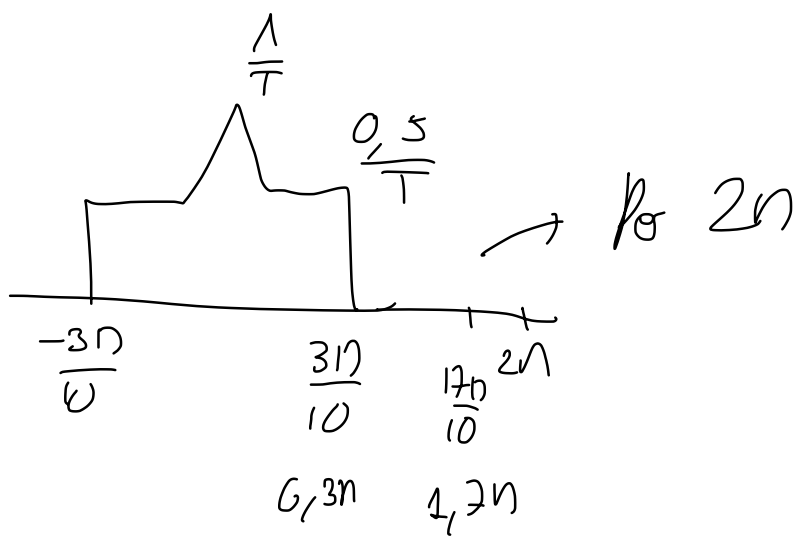
$X_2(e^{j\Omega})$



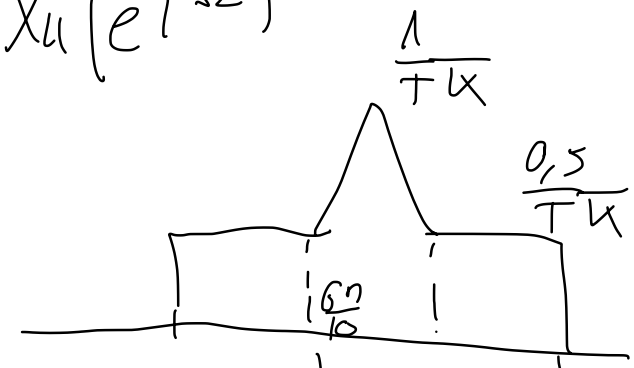
No solape, impulsos

$X_3(e^{j\Omega})$





$X_4(e^{j\Omega})$



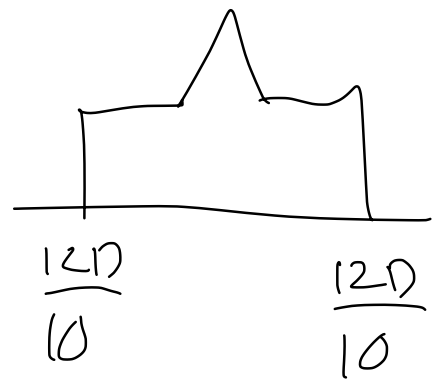
$-\frac{3\pi}{10}K$ $\quad \frac{3\pi}{10}K$

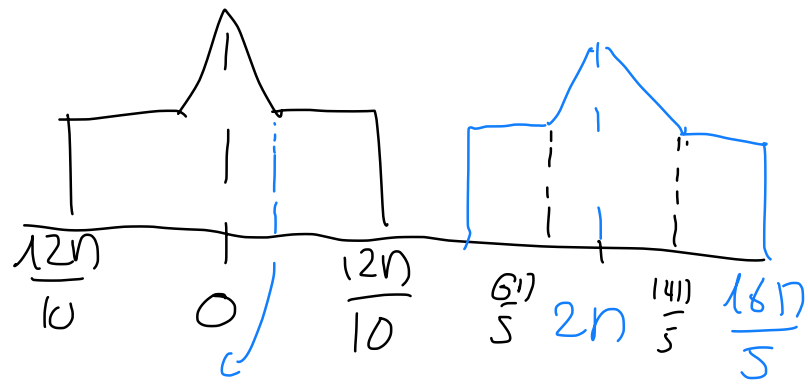
$\frac{\pm 2\pi}{10}$ $\quad \frac{\pm 2\pi}{10}$

$\frac{W_M T}{2}K \rightarrow \frac{2000\pi \cdot 10^{-3} \cdot 4}{2}$

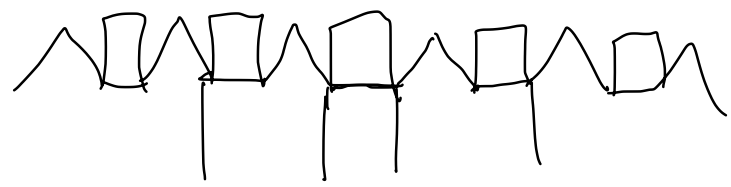
$\frac{3\pi}{5} = \frac{6\pi}{10}$

→ Hacer slope





$\frac{3\pi}{5} + \frac{\pi}{5} \quad \frac{4\pi}{5} = \frac{8\pi}{10}$

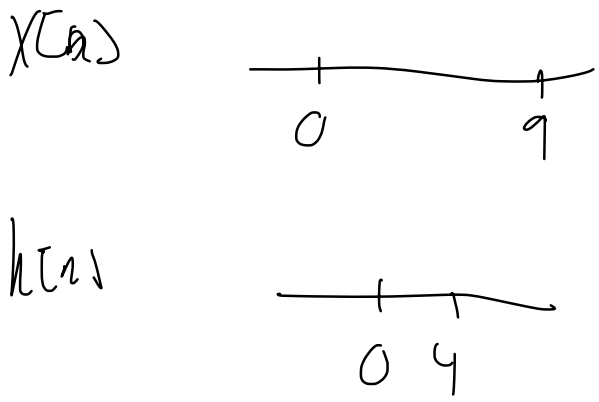


b) $X_2(e^{j\omega})$ en $0,8\pi$ rad

$\frac{2\pi}{10} > 0,8 > \frac{4\pi}{20}$ $\quad \frac{0,5}{T = 10^{-3}}$ $\quad 500$

c) Es 0

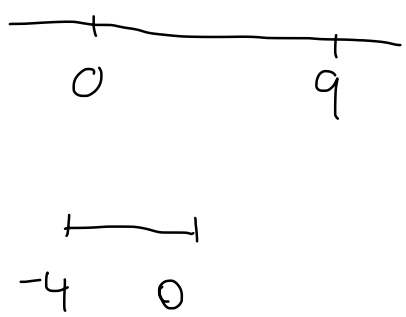
Ejercício 3



qcc (N)

Diap 52

a)

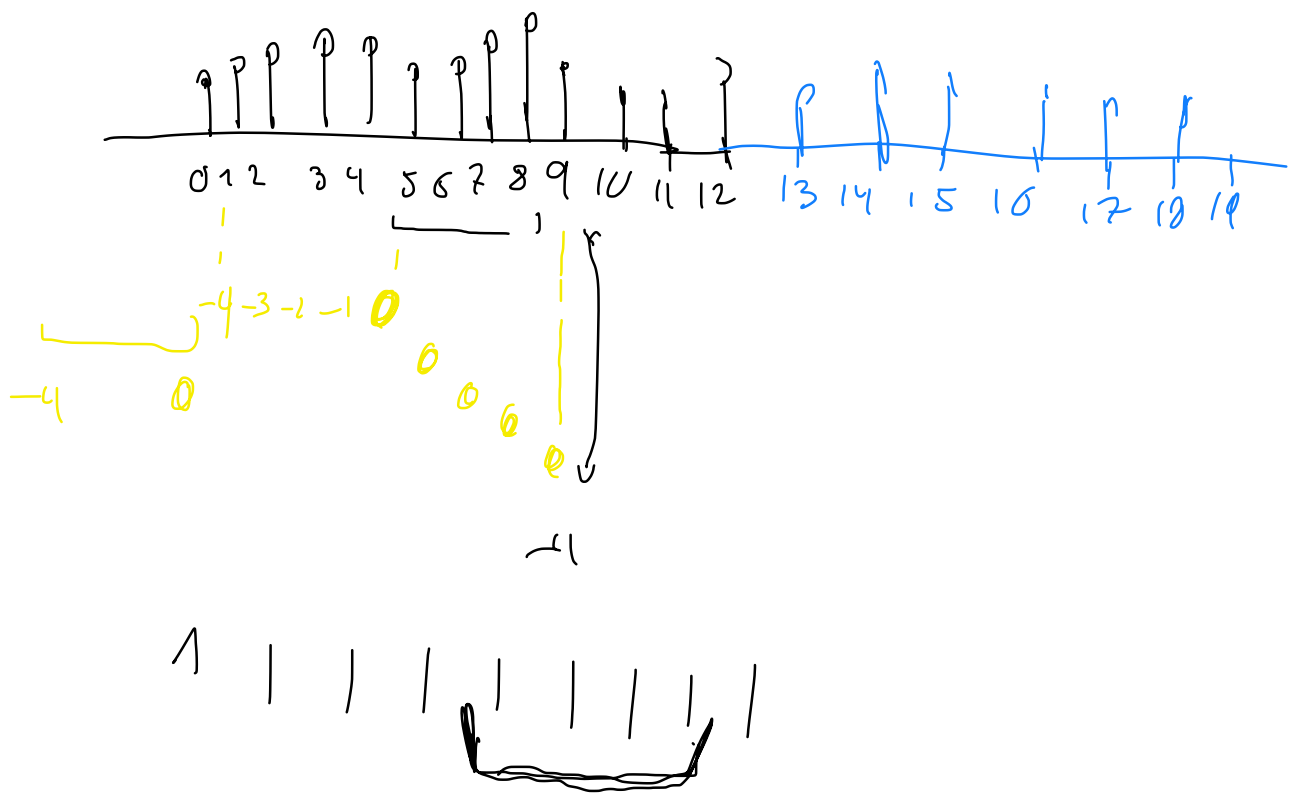


→ Lmel

10 + 5 = 15 - 1

N ≥ 14

b) n = 5, 6, 78



Ejercicio 4

$$\frac{7 - 9{,}5z^{-1} - 3{,}5z^{-2} + 5{,}5z^{-3}}{(1-z^{-2})(1-0{,}5z^{-1})(1-1{,}5z^{-1})}$$

$z = -0{,}74 \; ; \; z = 0{,}84 \; ; \; z = 1{,}26$ // Pdo: $z = \pm 1$

$z = \frac{1}{2} \qquad z = \frac{3}{2}$

$$\frac{A}{\left(1-\frac{1}{2}z^{-1}\right)} + \frac{B}{\left(1-\frac{3}{2}z^{-1}\right)} + \frac{C}{(1-z^{-1})} + \frac{D}{(1+z^{-1})} = \frac{7 - 9{,}5z^{-1} - 3{,}5 \; \text{—}}{}$$

$$7 - 9{,}5z^{-1} - 3{,}5z^{-2} + 5{,}5z^{-3} = A\left(1-\frac{3}{2}z^{-1}\right)(1-z^{-1})(1+z^{-1})$$
$$+ B\left(1-\frac{1}{2}z^{-1}\right)(1-z^{-1})(1+z^{-1})$$
$$+ C\left(1-\frac{1}{2}z^{-1}\right)\left(1-\frac{3}{2}z^{-1}\right)(1+z^{-1})$$
$$+ D\left(1-\frac{1}{2}z^{-1}\right)\left(1-\frac{3}{2}z^{-1}\right)(1-z^{-1})$$

$z = 1/2$

$\sim\sim = \cancel{B} \; \cancel{C} \; \cancel{D} = A(\;)(\;)(\;)$

$z = \frac{3}{2}$

$\sim\sim = B(\;)$

$$z = \lambda = D(\quad)$$

$$z = -\lambda = C(\quad)$$