EXAMEN PARCIAL NOVIEMBRE 2017

Ejercicio 1

$$x[n] = \delta[n-1] + \frac{1}{2} e^{j\frac{\pi}{3}n}$$

↳ Periodo $\frac{2\pi}{\pi/3} \Rightarrow \boxed{6 = N}$

a) Potencia y energía.

$\delta[n-1]$ → No es periódica $\Rightarrow \boxed{P = 0}$

$\frac{1}{2} e^{j\frac{\pi}{3}n}$ → Periódica $\Rightarrow \boxed{E = \infty}$ Está definida a Potencia

Potencia:

$$P_m = \frac{1}{6} \sum_{0}^{6} \left| \frac{1}{2} e^{j\frac{\pi}{3}n} \right|^2 = \frac{1}{6} \sum_{0}^{6} \left| \frac{1}{2} \right|^2 = \frac{1}{6} \cdot 6 \cdot \frac{1}{4} = 1/4$$

(módulo)

b) No es periódica, porque la delta no es periódica

c) TF:

$$TF\{\delta[n-1]\} \rightarrow 1 \cdot e^{-j\Omega}$$

$$TF\left\{\frac{1}{2} e^{j\frac{\pi}{3}n}\right\} \rightarrow \frac{1}{2} 2\pi \delta\left(\Omega - \frac{\pi}{3}\right)$$

$$\Big\} \pi \delta\left(\Omega - \frac{\pi}{3}\right) + e^{-j\Omega}$$

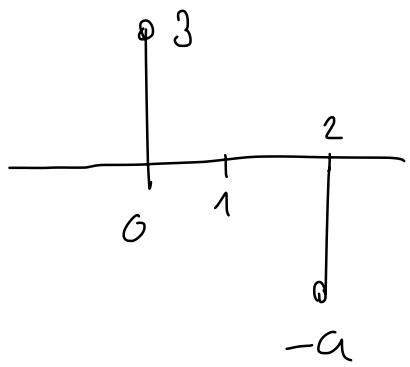
Periódica 2π

d) En tiempo no hay simetría

↳ En frec no hay simetría.

Ejercicio 2

$h[n]$



a)

$$x[n] \rightarrow \boxed{LTI} \rightarrow y[n]$$

$x[n] = 1$

Convolución $\boxed{y[n] = 3-a}$

cte si convolucionamos en todos los puntos queda $3-a$

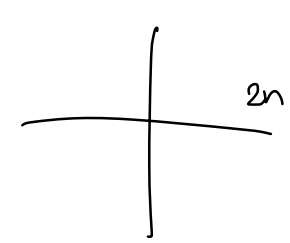
b) $TF\{h[n]\} = 3\delta[n] - a\,\delta[n-2]$

$$\boxed{H(e^{j\Omega}) = 3 \qquad -a e^{-j2\Omega}}$$

c) $3 - a e^{-j2\Omega}\Big|_{\Omega=0} = 0 \Rightarrow 3-a=0 \Rightarrow \boxed{a=3}$

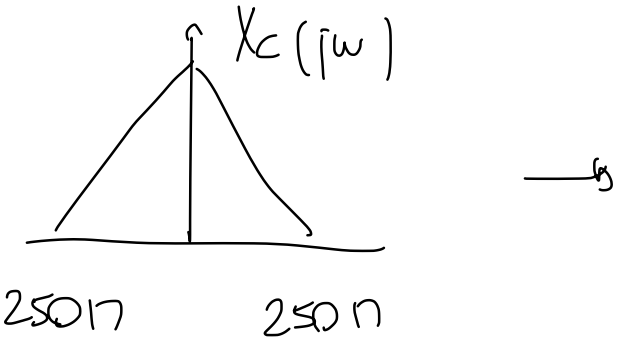
d) $3 - a e^{-j2\Omega}\Big|_{\Omega=\pi} = 0 \Rightarrow 3 - a\,\underbrace{e^{-j2\pi}}_{=1} = 0 \Rightarrow 3-a=0$

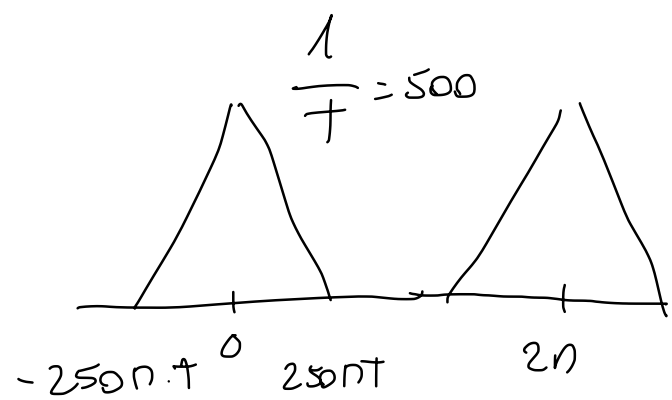
$\boxed{a=3}$



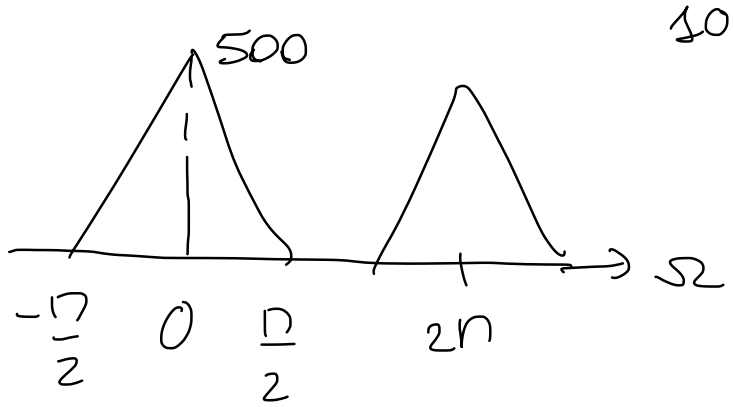
Ejercicio 3

a)





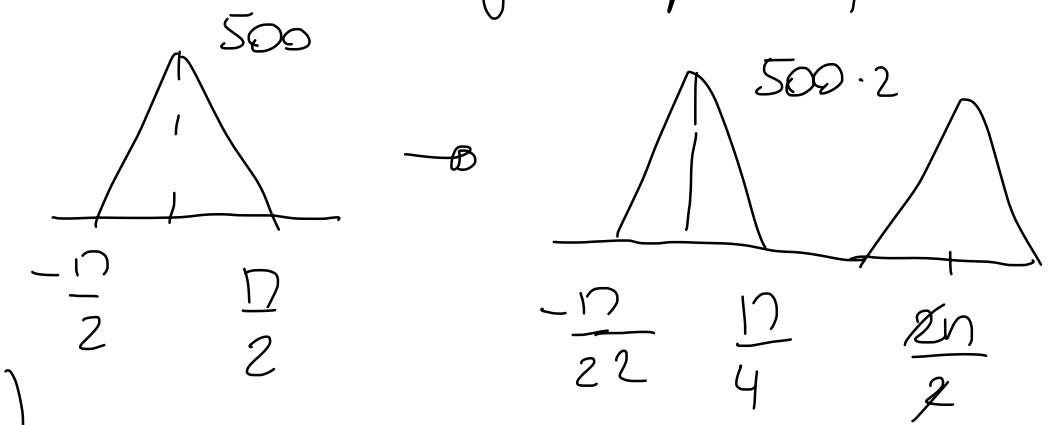
$$\frac{2500\pi \cdot 2}{1000} = \frac{\pi}{2} \qquad \frac{1}{2}\,1000$$



Periódica 2π

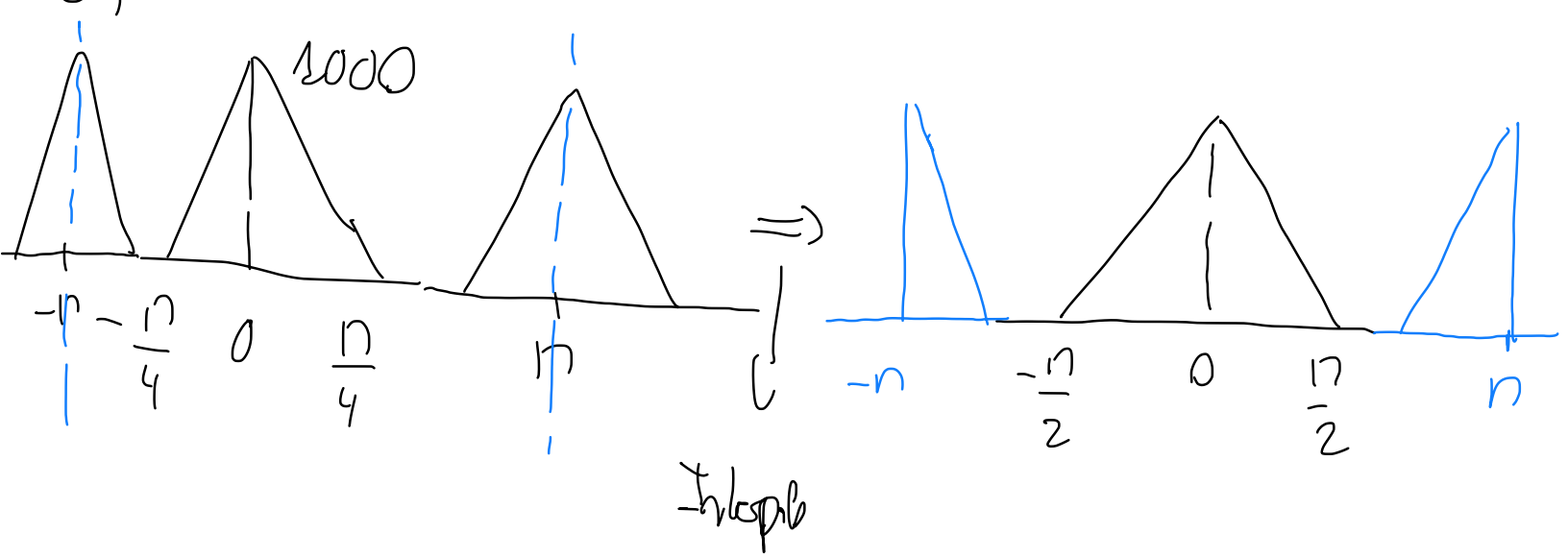
Nyquist ✓

b) Interpolar y multiplicar por 2 en la amplitud.

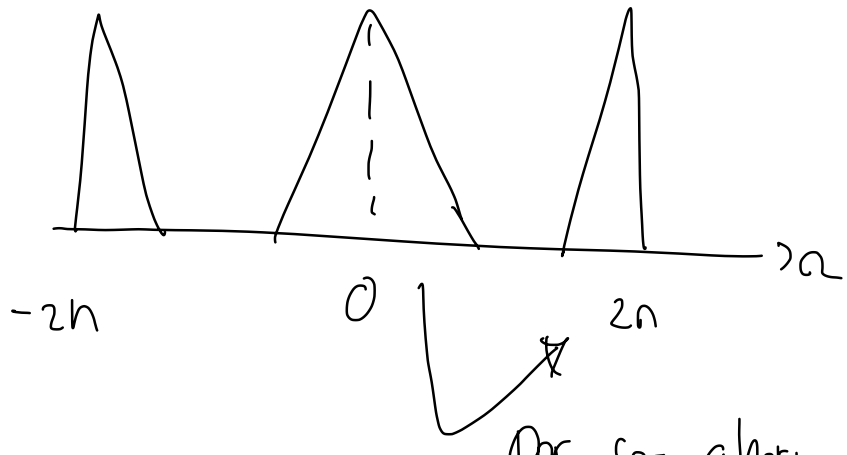


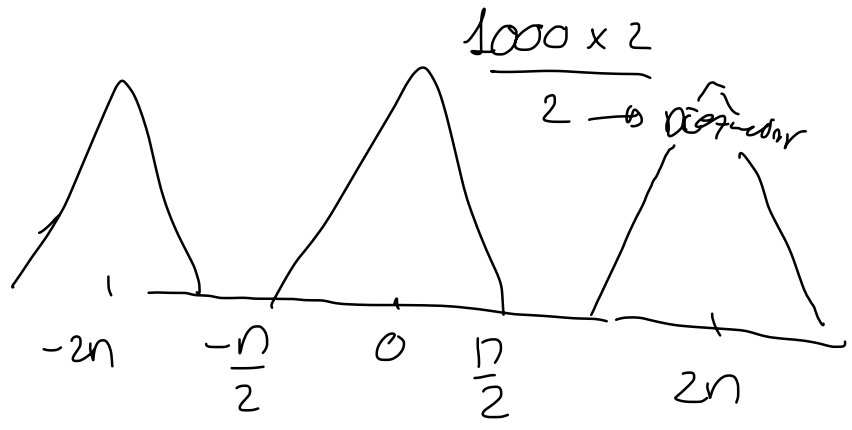
Periódica π.

c)



Interpolé





por ser ahora periodo 2π te va solapado perfecto.

$L = 16$