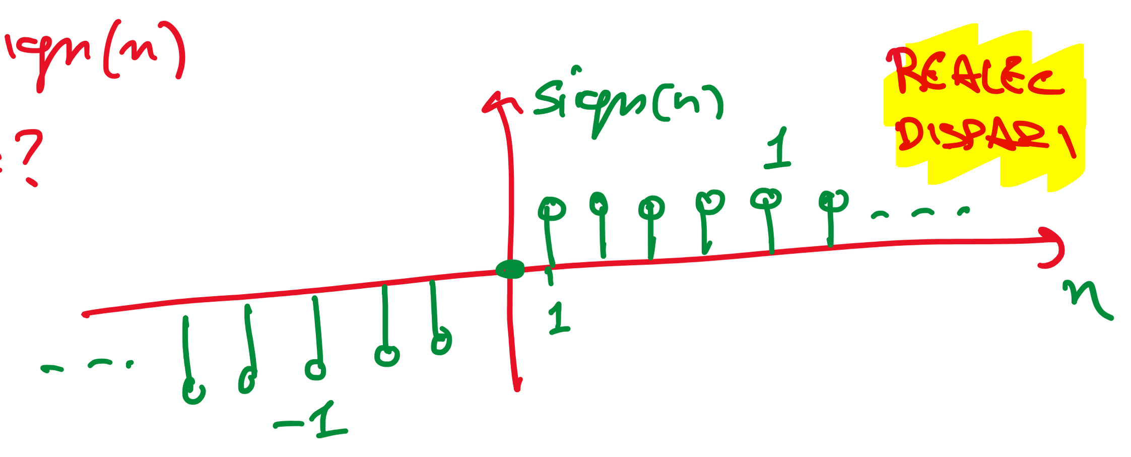
Le21

Sunday, 5 May 2024 23:32

Es 1g

$s(n) = \text{sign}(n)$

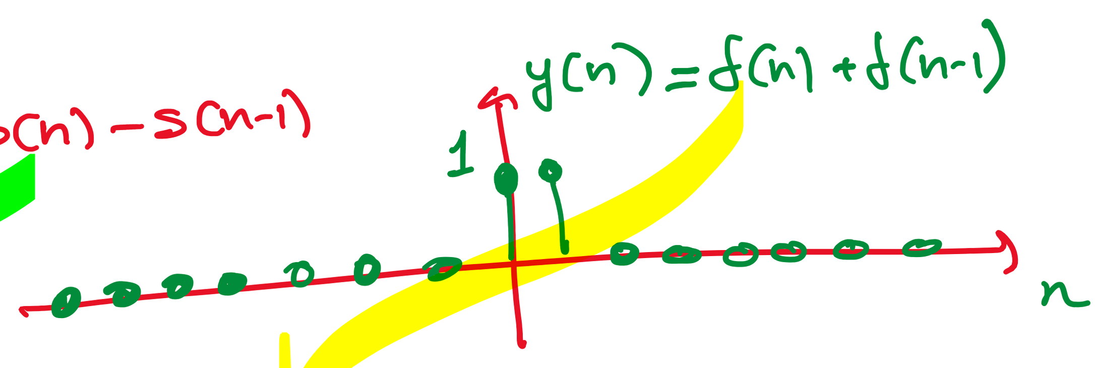
$S(e^{j\theta}) = ?$



REALE E DISPARI

$y(n) = s(n) - s(n-1)$

$y(n) = \delta(n) + \delta(n-1)$



$Y(e^{j\theta}) = 1 + e^{-j\theta} = S(e^{j\theta})\,(1 - e^{-j\theta})$

$$S(e^{j\theta}) = \begin{cases} \dfrac{1+e^{-j\theta}}{1-e^{-j\theta}} & \theta \neq K \cdot 2\pi \\ 0 & \theta = K \cdot 2\pi \end{cases}$$

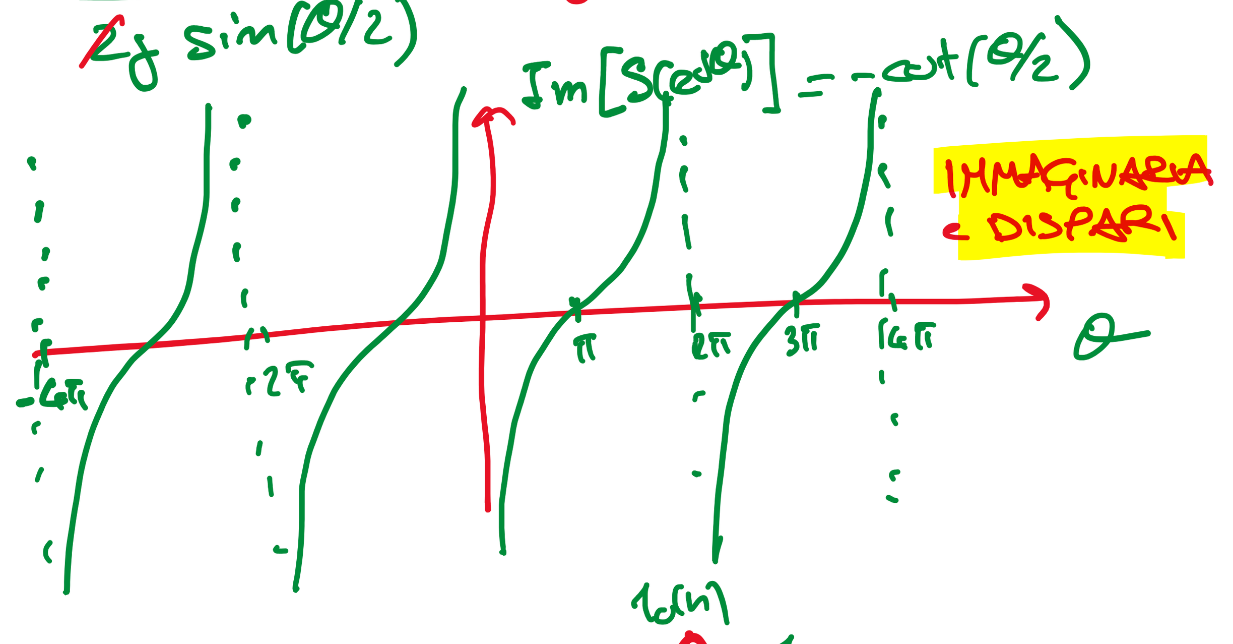
VALOR MEDIO

$m_s \xrightarrow{\mathcal{F}} m_s \cdot 2\pi \, \text{rep}_{\pi}\, \delta(\theta)$

$$S(e^{j\theta}) = \frac{1+e^{-j\theta}}{1-e^{-j\theta}} \cdot \frac{e^{j\theta/2}}{e^{j\theta/2}} = \frac{e^{j\theta/2} + e^{-j\theta/2}}{e^{j\theta/2} - e^{-j\theta/2}}$$

$$= \frac{2\cos(\theta/2)}{2j\sin(\theta/2)} = -j\cot(\theta/2)$$

$\text{Im}[S(e^{j\theta})] = -\cot(\theta/2)$

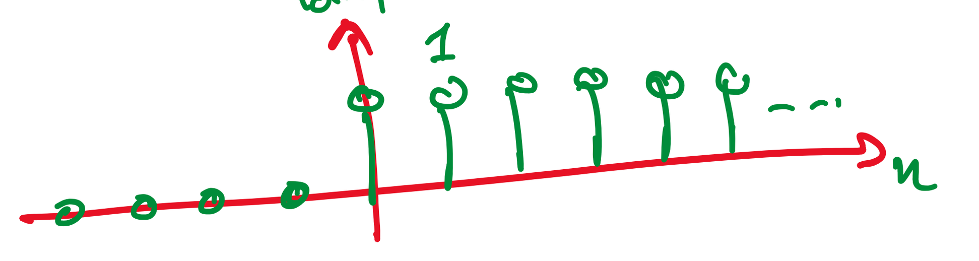


IMMAGINARIA E DISPARI

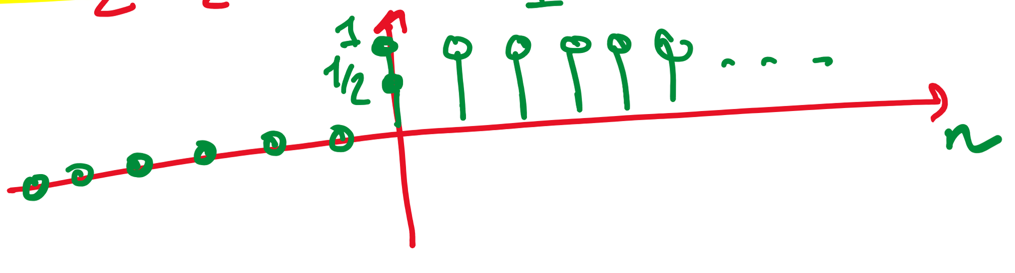
Es 1h

$s(n) = 1_0(n)$

$S(e^{j\theta}) = ?$



$s(n) = 1_0(n) = \frac{1}{2} + \frac{1}{2}\text{sign}(n) + \frac{1}{2}\delta(n)$

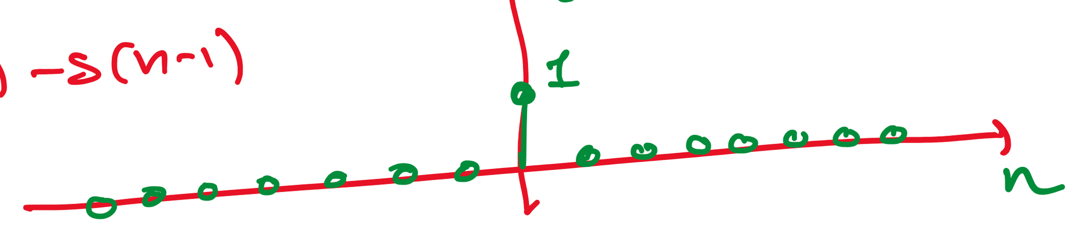


$$S(e^{j\theta}) = \frac{1}{2} \cdot 2\pi\, \text{rep}_{2\pi}\, \delta(\theta) + \frac{1}{2} \cdot -j\cot\left(\frac{\theta}{2}\right) + \frac{1}{2}$$

REGOLA INCREMENTO

$y(n) = s(n) - s(n-1)$

$y(n) = \delta(n)$



$Y(e^{j\theta}) = 1 = S(e^{j\theta})\,(1 - e^{-j\theta})$

$$S(e^{j\theta}) = \frac{1}{1-e^{-j\theta}} + m_s \cdot 2\pi\, \text{rep}_{2\pi}\, \delta(\theta)$$

$m_s = 1/2$

$$\frac{1}{2} + \frac{1}{2}\, {-j}\cot(\theta/2) = \frac{1}{2} + \frac{1}{2}\,\frac{1+e^{-j\theta}}{1-e^{-j\theta}} = \frac{1 - e^{-j\theta} + 1 + e^{-j\theta}}{2(1-e^{-j\theta})}$$

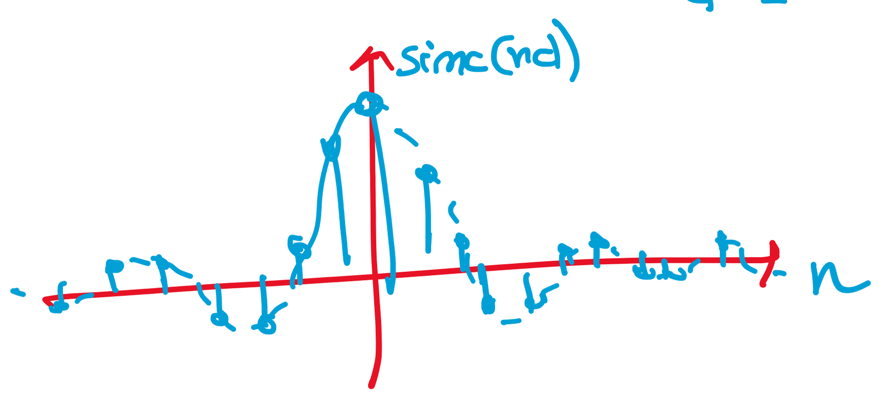
$$= \frac{1}{1-e^{-j\theta}}$$

Es 1i

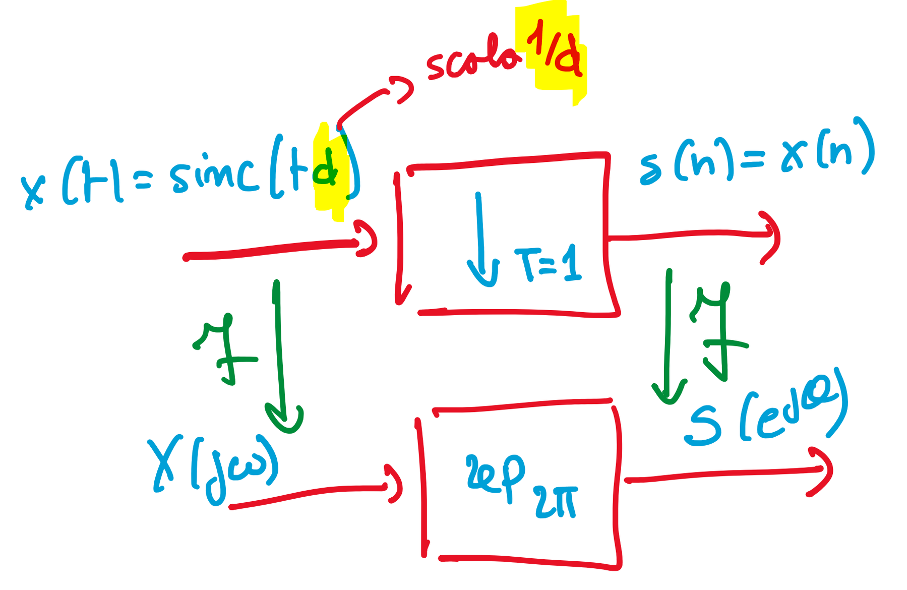
$s(n) = \text{sinc}(nd)$

$S(e^{j\theta}) = ?$

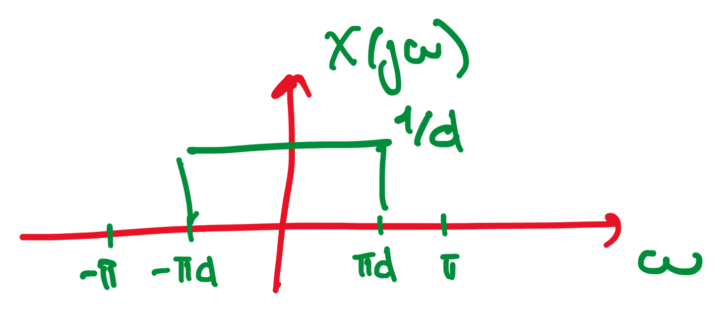
$d < 1$



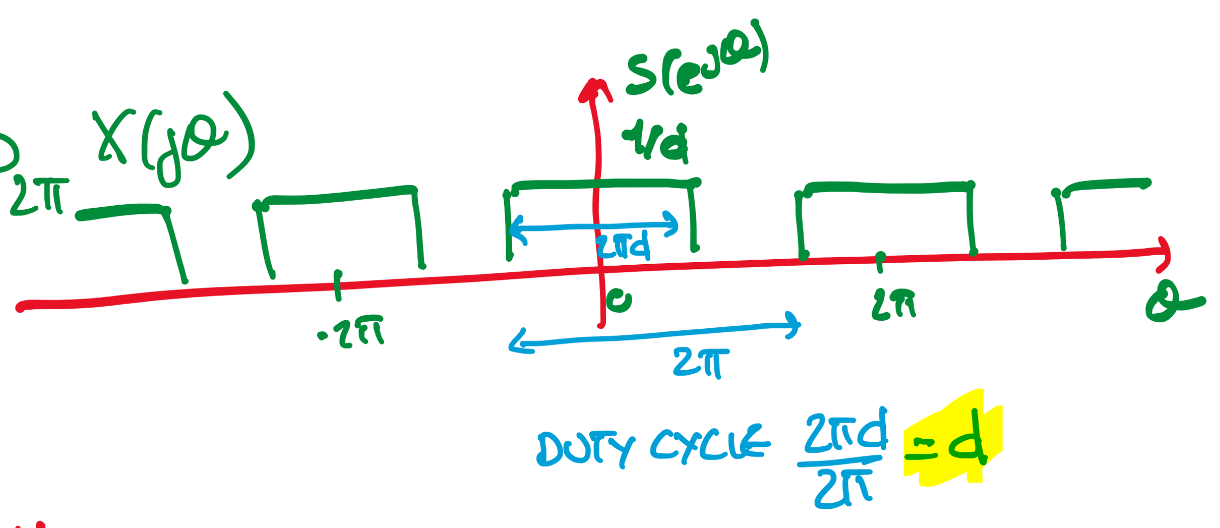
scala 1/d



$$X(j\omega) = \frac{1}{d}\, \text{rect}\left(\frac{\omega}{2\pi d}\right)$$



$$S(e^{j\theta}) = \text{rep}_{2\pi}\, X(j\theta)$$



DUTY CYCLE $\frac{2\pi d}{2\pi} = d$

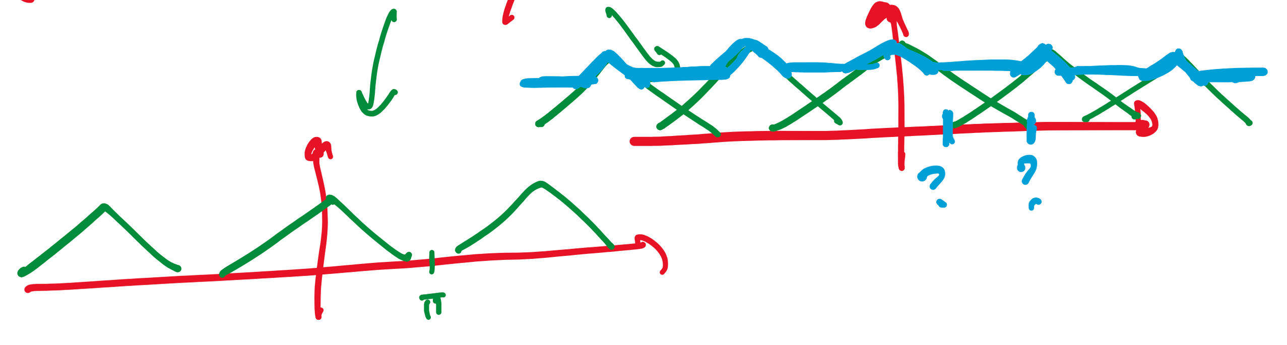
$$d\,\text{sinc}(nd) \xrightarrow{\mathcal{F}} \text{rep}_{2\pi}\left(\frac{\theta}{2\pi d}\right)$$ ONDA QUADRA d

X CASA

$s(n) = \text{sinc}^2(nd)$

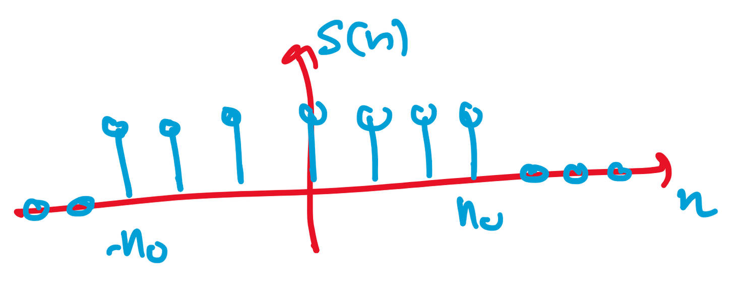
$S(e^{j\theta}) = ?$

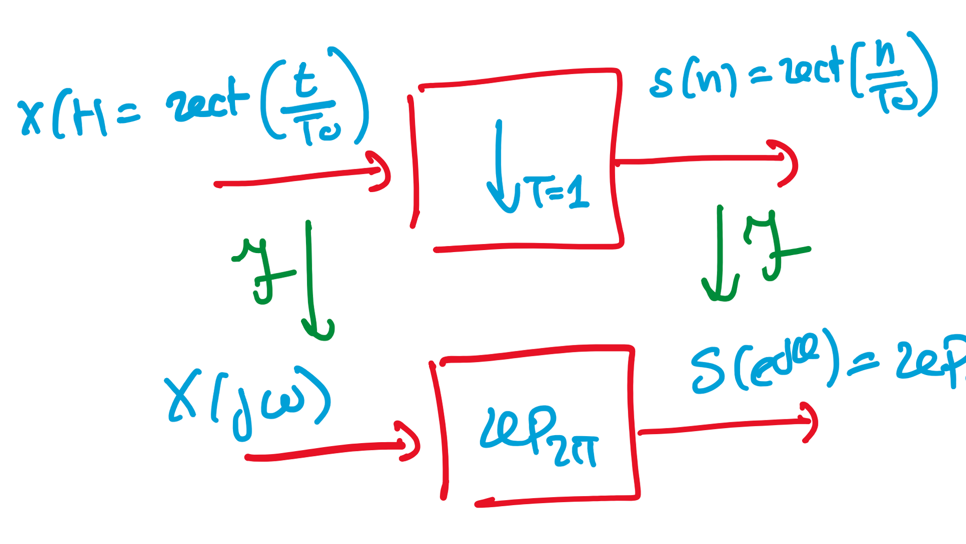
$d < 1/2$ / $d > \frac{1}{2}$



Es 1e

$$s(n) = \text{rect}\left(\frac{n}{2n_0+1}\right)$$





$T_0 = 1 + 2n_0$

$$X(j\omega) = T_0\, \text{sinc}\left(\frac{\omega T_0}{2\pi}\right)$$

$$S(e^{j\theta}) = T_0\, \text{rep}_{2\pi}\, \text{sinc}\left(\frac{\theta}{2\pi/T_0}\right)$$