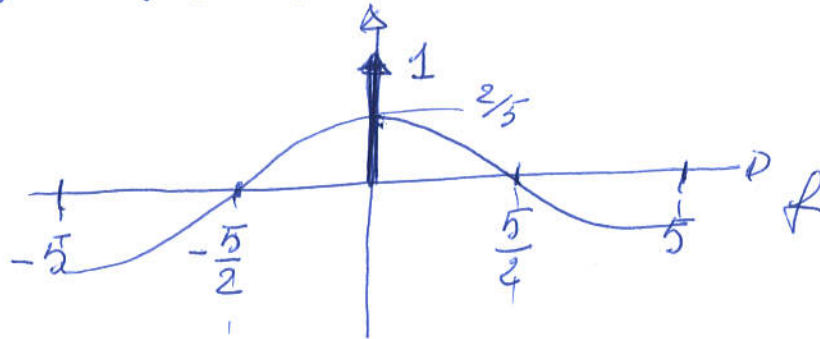


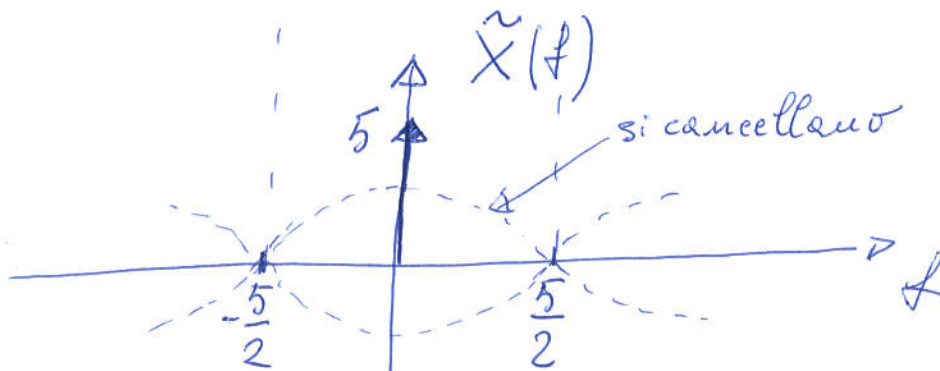
ESERCIZIO 1

9-6-2020

A) $X(f) = \delta(f) + \frac{2}{5} \text{rect}\left(\frac{f}{10}\right) \cos\left(2\pi \frac{1}{10} f\right)$

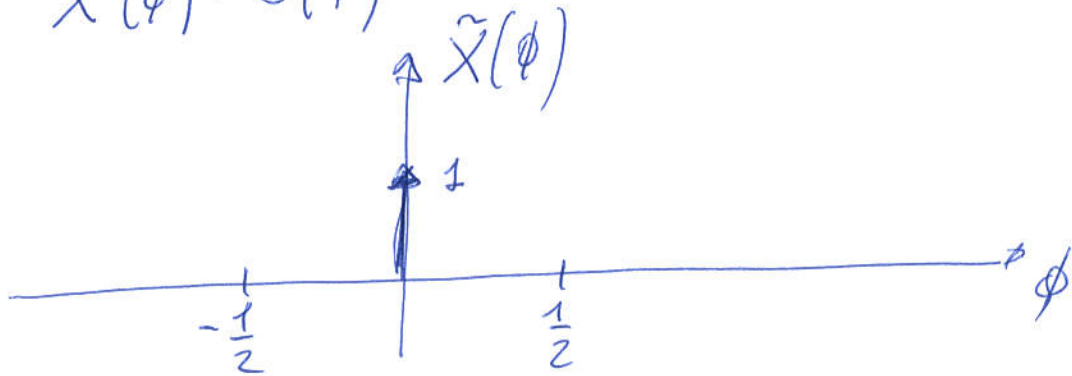


B)



$\tilde{X}(f) = 5\delta(f)$ periodica di 5

$\tilde{X}(\phi) = \delta(\phi)$ " di 1



C) $X_n = 1$ (costante discreta)

$X_k = 12\delta_k$

ESERCIZIO 2

9-6-2020

$$A) m_x = \frac{-2 - 22}{2} = -12 \quad \sigma_x^2 = \frac{\Delta^2}{12} = \frac{400}{12} = \frac{100}{3}$$

$$R_x(\tau) = \frac{\sigma_x^2}{20} \cdot \frac{\sin \pi 20 \tau}{\pi \tau} + m_x^2 \\ = \frac{5}{3} \cdot \frac{\sin \pi 20 \tau}{\pi \tau} + 144$$

$$B) S_y(f) = S_x(f) \cdot |H(f)|^2 =$$

$$= \left[\frac{5}{3} \text{rect}\left(\frac{f}{20}\right) + 144 \delta(f) \right] \cdot \left| 1 + 2e^{-j2\pi 5f} \right|^2 \\ = \frac{5}{3} \text{rect}\left(\frac{f}{20}\right) \cdot \left[5 + 4 \cos(2\pi 5f) \right] + 144 \cdot 9 \cdot \delta(f)$$

$$C) R_y(\tau) = \left[\frac{5}{3} \frac{\sin \pi 20 \tau}{\pi \tau} + 144 \right] * \left[5 \delta(\tau) + 2 \delta(\tau \pm 5) \right] = \\ = \frac{25}{3} \frac{\sin \pi 20 \tau}{\pi \tau} + \frac{10}{3} \frac{\sin \pi 20(\tau \pm 5)}{\pi(\tau \pm 5)} + 144 \cdot 9$$

$$\text{Potenza } y = R_y(0) = \frac{25 \cdot 20}{3} + 0 + 1296 \approx 1462$$

$$\text{oppure } \text{''} = \int_{-\infty}^{\infty} S_y(f) df = 1462$$