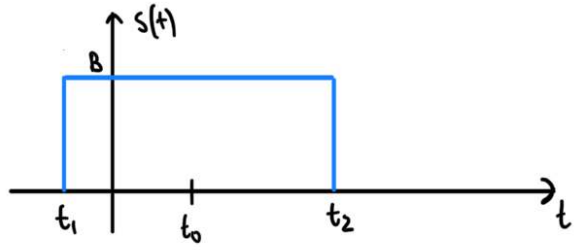
Lezione 5 - 7/03/2024

ESERCIZIO

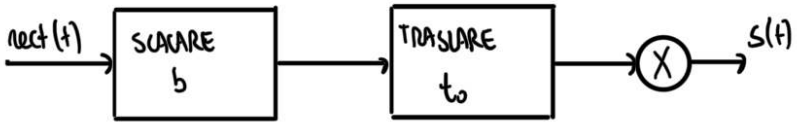
RAPPRESENTARE IL SEGNALE $s(t)$ IN FUNZIONE DI $rect(t)$



SOL. bisogna trasformare $rect(t)$ in $s(t)$

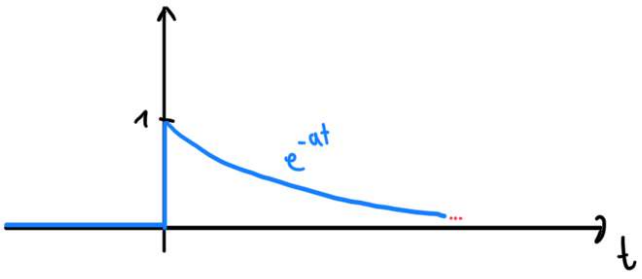
BASE: $t_2 + t_1 = b$

CENTRATO IN: $t_0 = \frac{t_2 - t_1}{2}$

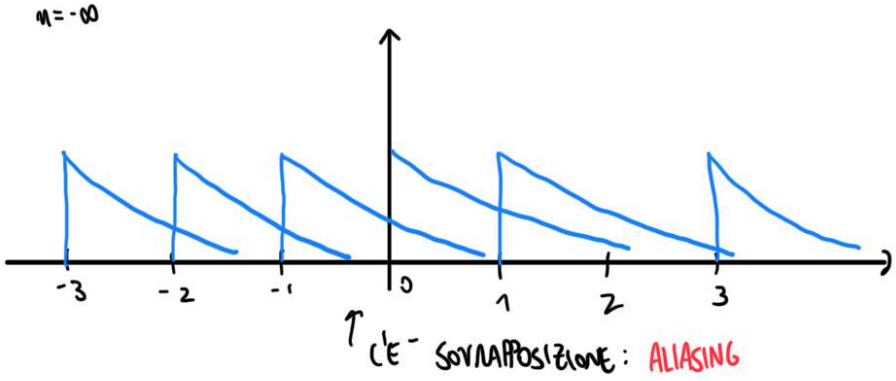


ESERCIZIO 1 (slide 40)

$s(t) = rect_{T_p} v(t)$, con $v(t) = e^{-at} 1(t)$ $\quad a > 0$



$$s(t) = \sum_{n=-\infty}^{+\infty} v(t - nT)$$



↑ C'È SOVRAPPOSIZIONE: ALIASING

come la gestisco?

Troviamo la SERIE NEL PERIODO $(0, T_p)$

in questo periodo sono attive solo le componenti per $n \leq 0$

$$s(t) = \sum_{n=-\infty}^{0} h(t - nT_p)$$

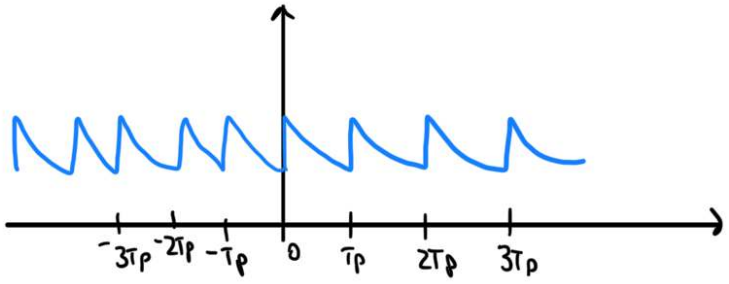
$$= \sum_{n=-\infty}^{0} e^{-a(t-nT_p)} = e^{-at} \sum_{m=-\infty}^{0} e^{amT_p}$$

$$\left(e^{aT_p}\right)^m = \alpha^m \quad \text{SERIE GEOMETRICA}$$

$$= e^{-at} \sum_{m=0}^{+\infty} e^{-amT_p} = e^{-at} \sum_{m=0}^{+\infty} \alpha^m \qquad \left(\alpha = e^{-aT_p}\right) < 1$$

$$= \frac{e^{-at}}{1-\alpha} = \frac{e^{-aT_p}}{1-e^{-aT_p}}$$

Ora possiamo tracciare il grafico



$$\Rightarrow s(t) = \begin{cases} F(t) = \dfrac{e^{-at}}{1-e^{-aT_p}} & t \in (0, T_p) \\ F(t-T_p) = \dfrac{e^{-a(t-T_p)}}{1-e^{-aT_p}} & t \in [T_p, 2T_p] \end{cases}$$