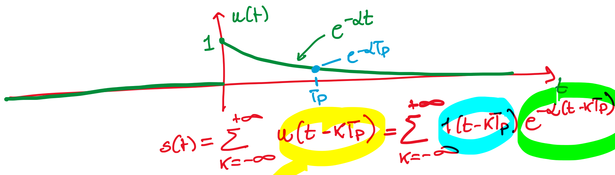
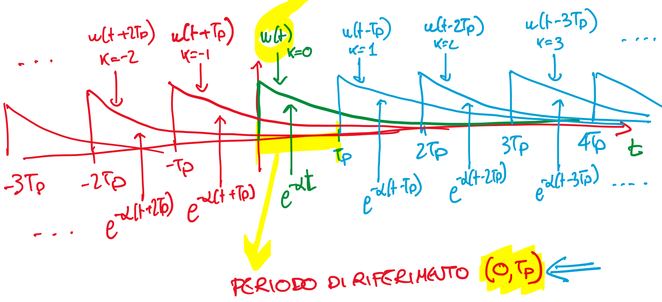
Le06

Friday, 6 March 2026 08:34

Es 1 TROVARE $s(t) = 2ep_{T_p}\, u(t)$ con $u(t) = 1(t)e^{-\alpha t}$, $\alpha > 0$



$$s(t) = \sum_{k=-\infty}^{+\infty} u(t - kT_p) = \sum_{k=-\infty}^{+\infty} 1(t - kT_p)\, e^{-\alpha(t-kT_p)}$$



PERIODO DI RIFERIMENTO $(0, T_p)$

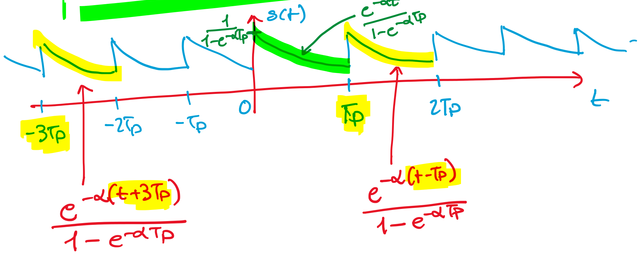
$$s(t) = \sum_{k=-\infty}^{0} 1(t - kT_p)\, e^{-\alpha(t-kT_p)}$$

$$= \sum_{k=-\infty}^{0} e^{-\alpha(t-kT_p)}\, e^{-\alpha t}\, e^{\alpha k T_p}$$

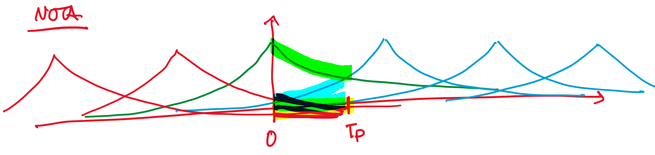
$$= e^{-\alpha t} \sum_{k=-\infty}^{0} e^{\alpha T_p \cdot k} \qquad m = -k$$

$$= e^{-\alpha t} \sum_{m=0}^{+\infty} \left(e^{-\alpha T_p}\right)^m$$

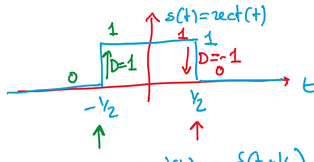
$$\boxed{s(t) = \frac{e^{-\alpha t}}{1 - e^{-\alpha T_p}} \qquad \text{PER } t \in (0, T_p)}$$

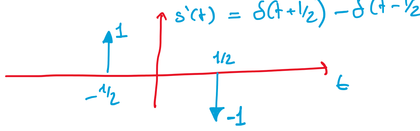


NOTA

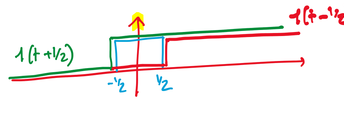


Es 2 TROVARE LA DERIVATA GENERALIZZATA DI $\mathrm{rect}(t)$





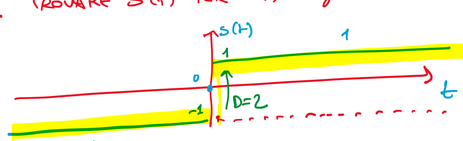
$1'(t) = \delta(t)$



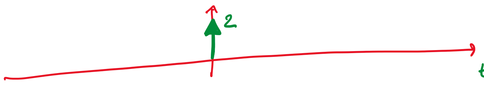
$$s(t) = \mathrm{rect}(t) = 1(t + 1/2) - 1(t - 1/2)$$

$$s'(t) = \delta(t + 1/2) - \delta(t - 1/2)$$

Es 3 TROVARE $s'(t)$ PER $s(t) = \mathrm{sgn}(t)$



$$s'(t) = 2\delta(t)$$



$$s(t) = \mathrm{sgn}(t) = -1 + 2 \cdot 1(t)$$

$$s'(t) = 2 \cdot \delta(t)$$