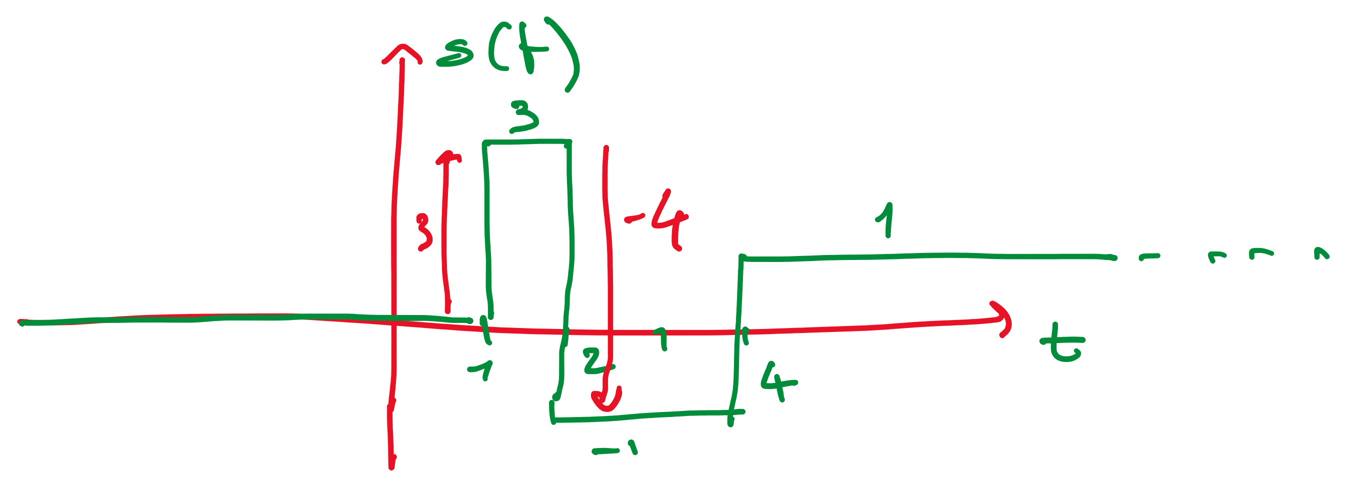
# Le07

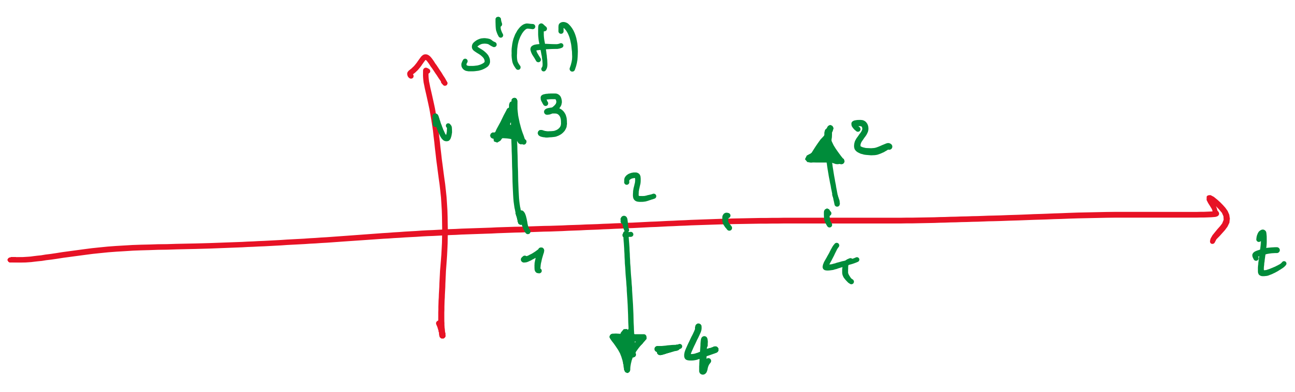
Monday, 10 March 2025 00:02

## Es 1




CALCOLARE $s'(t) = ?$

$$s'(t) = 3\cdot\delta(t-1) - 4\delta(t-2) + 2\delta(t-4)$$




$$s(t) = 3\,1(t-1) - 4\,1(t-2) + 2\,1(t-4)$$

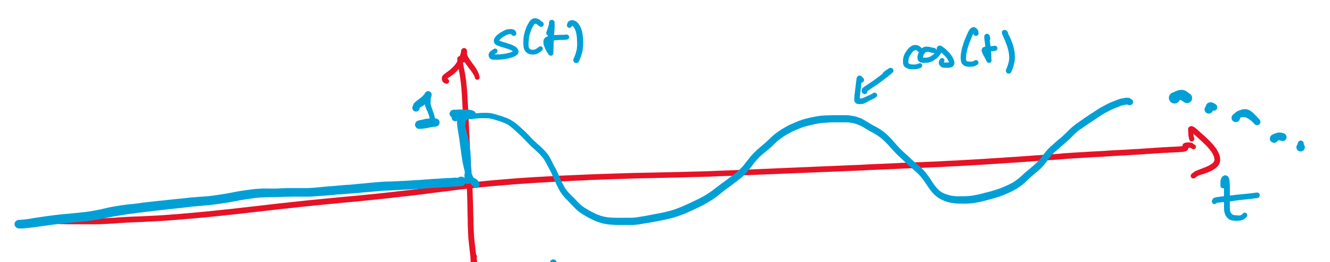
## Es 2

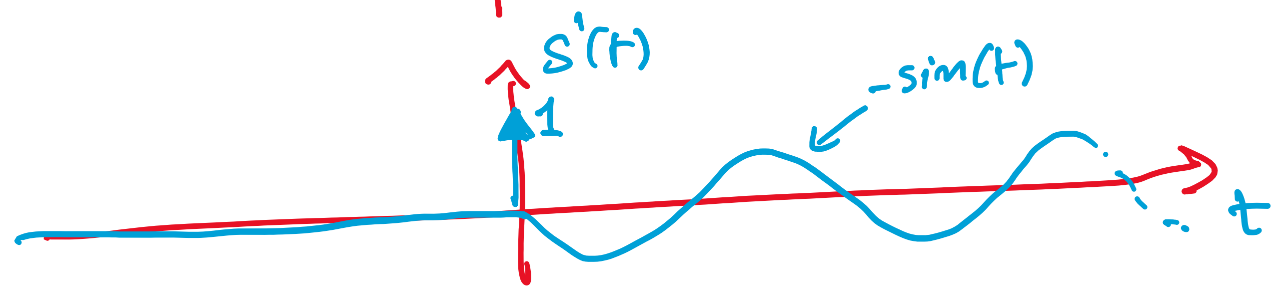
$s(t) = \cos(t)\,1(t)$

$s'(t) = ?$

$$s'(t) = -\sin(t)\cdot 1(t) + \cancel{\cos(t)}\,\delta(t)$$

$$= \delta(t) - \sin(t)\,1(t)$$




## Es 3

SIGNIFICATO DELL'AZIONE DI $\delta'(t)$

$$\int_{-\infty}^{+\infty} s(t)\,\delta'(t-t_0)\,dt = ?$$

$\delta(t-t_0)$, $s'(t)$

$$= \cancel{s(t)\,\delta(t-t_0)\Big]_{-\infty}^{+\infty}} - \int_{-\infty}^{+\infty} s'(t)\,\delta(t-t_0)\,dt$$

$$= -s'(t_0)$$

## Es 4

TROVARE $A_s, m_s, E_s, P_s$ DI $s(t) = e^{(\sigma_0 + j\omega_0)t}\,1(t)$

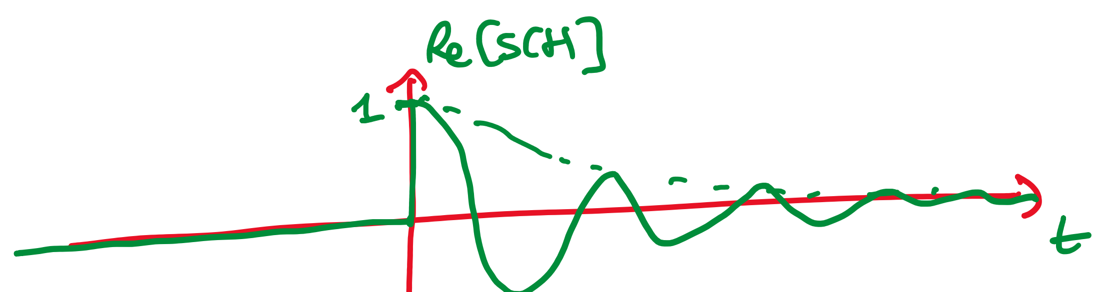
$\sigma_0 < 0$

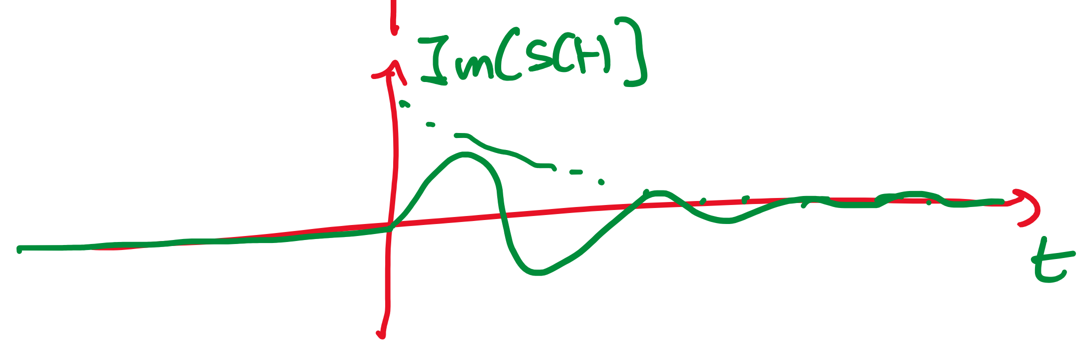
$\omega_0$ REALE

$$s(t) = e^{\sigma_0 t}\,e^{j\omega_0 t}\,1(t)$$

$$= e^{-|\sigma_0|t}\left(\cos(\omega_0 t) + j\sin(\omega_0 t)\right)1(t)$$

$$= e^{-|\sigma_0|t}\cos(\omega_0 t)\,1(t) + j\,e^{-|\sigma_0|t}\sin(\omega_0 t)\,1(t)$$




$s(t) = e^{s_0 t}\,1(t)$

$s_0 = \sigma_0 + j\omega_0$

$$A_s = \int_{-\infty}^{+\infty} s(t)\,dt$$

$$= \int_{\cancel{-\infty}\;0}^{+\infty} e^{s_0 t}\,\cancel{1(t)}\,dt = \frac{e^{s_0 t}}{s_0}\Big]_0^{+\infty} = -\frac{1}{s_0} = \frac{-1}{\sigma_0 + j\omega_0}$$

$$= \frac{-(\sigma_0 - j\omega_0)}{\sigma_0^2 + \omega_0^2} = \frac{-\sigma_0}{\sigma_0^2+\omega_0^2} + j\frac{\omega_0}{\sigma_0^2+\omega_0^2}$$

$m_s = 0$

$$|s(t)|^2 = |e^{\sigma_0 t}\,e^{j\omega_0 t}\,1(t)|^2$$

$$= (e^{\sigma_0 t})^2\cdot|e^{j\omega_0 t}|^2\cdot|1(t)|^2$$

$$= e^{2\sigma_0 t}\cdot 1\cdot 1(t)$$

$$= e^{-2|\sigma_0|t}\,1(t)$$

$$E_s = \int_{\cancel{-\infty}\;0}^{+\infty} e^{-2|\sigma_0|t}\,\cancel{1(t)}\,dt = \frac{e^{-2|\sigma_0|t}}{-2|\sigma_0|}\Bigg]_0^{+\infty}$$

$$= \frac{-1}{-2|\sigma_0|} = \frac{1}{2|\sigma_0|}$$

$P_s = 0$

## NOTA

$$x(t) \longrightarrow \boxed{\Sigma} \longrightarrow y(t) = x(t) + \cos(\omega_0 t)$$

$$x_1(t) \xrightarrow{\Sigma} x_1(t) + \cos(\omega_0 t) = y_1(t)$$

$$x_2(t) \xrightarrow{\Sigma} x_2(t) + \cos(\omega_0 t) = y_2(t)$$

$$x_1(t) + x_2(t) \xrightarrow{\Sigma} x_1(t) + x_2(t) + \cos(\omega_0 t) \neq y_1(t) + y_2(t)$$