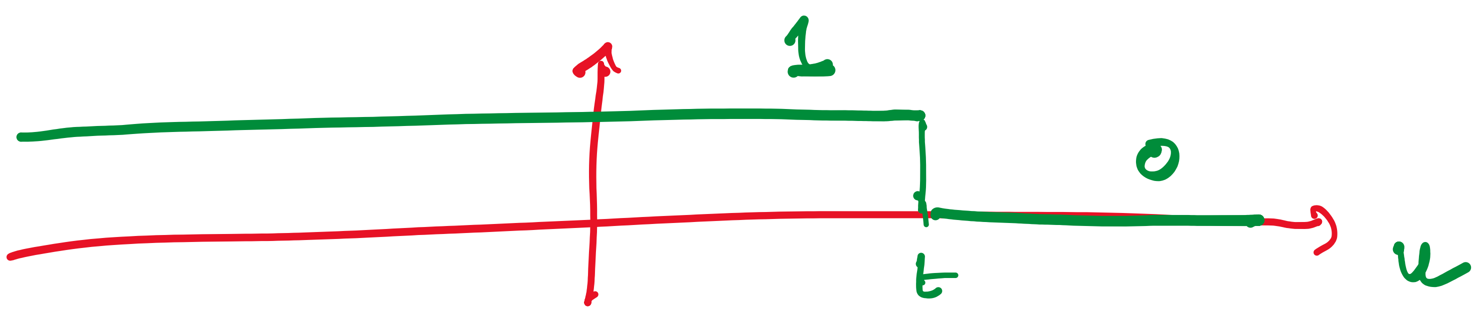
Le11

Thursday, 23 March 2023 01:23

ES 3.C

$$z(t) = \int_{-\infty}^{+\infty} e^{u} \sin(t-u+2)\, du \qquad 1(t-u)$$

$$x*y(t) \overset{?}{=} \int_{-\infty}^{+\infty} x(u)\, y(t-u)\, du$$



$$1_-(u-t) = 1(-(u-t)) = 1(t-u)$$

ATTIVO PER $t-u>0$ OVVERO $u<t$

$x(t) = e^{t}$

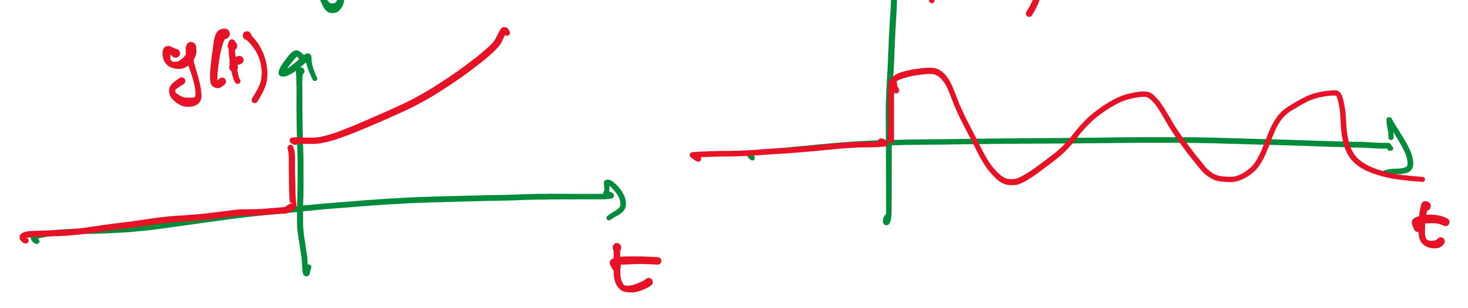
$y(t) = \sin(t+2)\,1(t)$

ES 3.D

$$z(t) = \begin{cases} 0 & t<0 \\ \int_{-\infty}^{+\infty} e^{t-u}\sin(u+2)\, du & t\geq 0 \end{cases}$$

$1(t-u)$ $\quad 1(u)$

$y(t) = e^{t}1(t)$ $\qquad x(t) = \sin(t+2)\,1(t)$



È VERO CHE $x*y(t) = 0$ PER $t<0$? SÌ

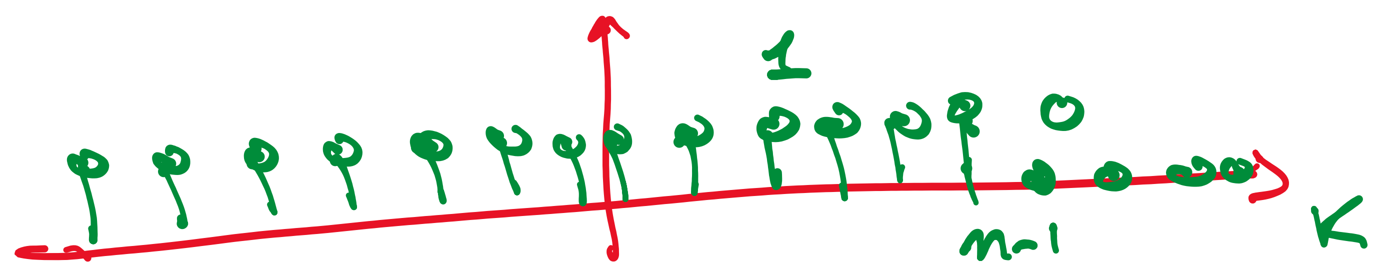
$\mathcal{E}_x = [0,+\infty)$ $\rightarrow$ $\mathcal{E}_{x*y} \subseteq [0,+\infty)$

$\mathcal{E}_y = [0,+\infty)$

ES 5

$$z(n) = \sum_{k=-\infty}^{+\infty} 3^{k}\, 1_0(n-k-1)$$

$$x*y(n) = \sum_{k=-\infty}^{+\infty} x(k)\, y(n-k)$$



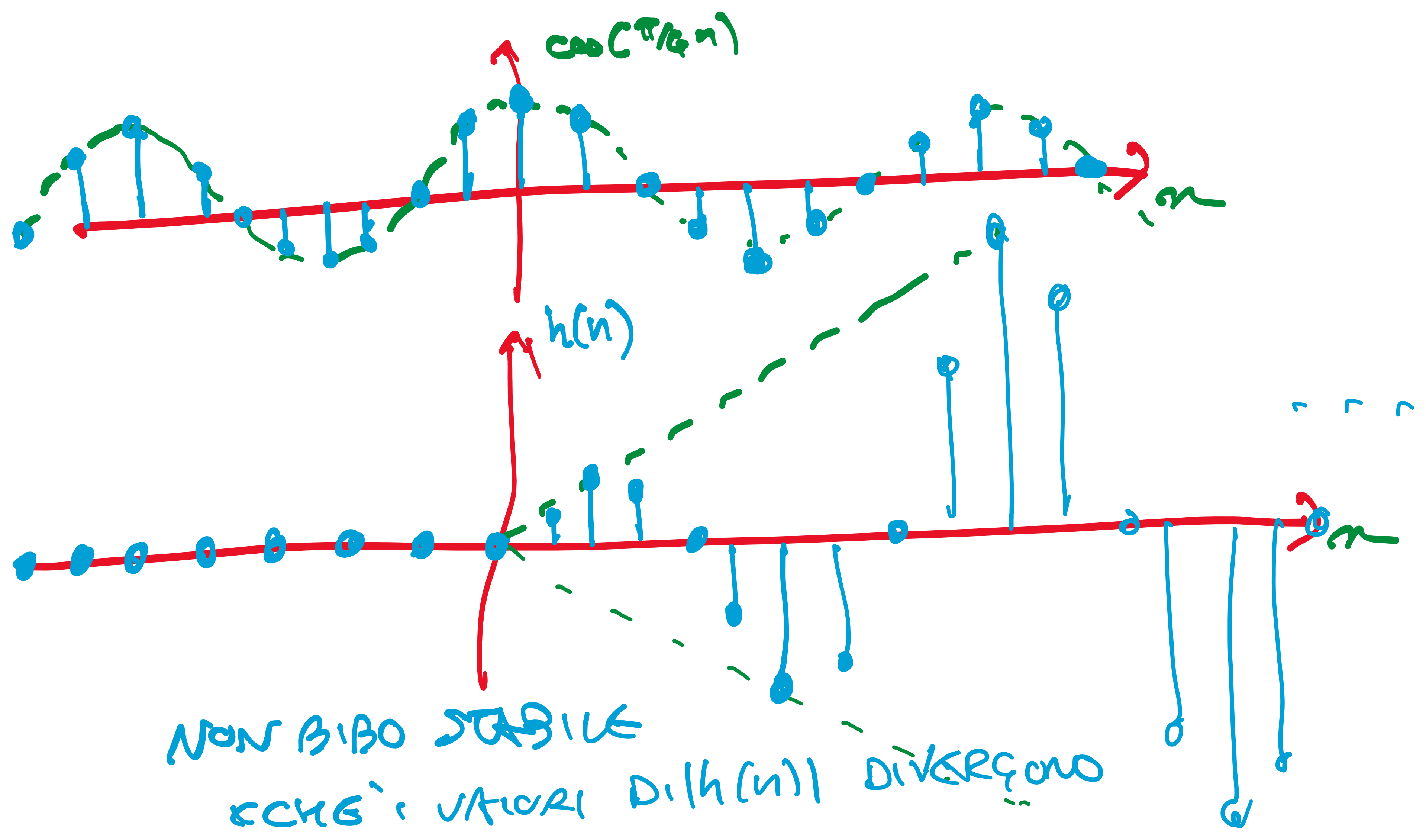
$$1_{0-}(k-(n-1)) = 1_0(n-1-k) = 1_0(n-k-1)$$

$x(n) = 3^{n}$

$y(n) = 1_0(n-1)$

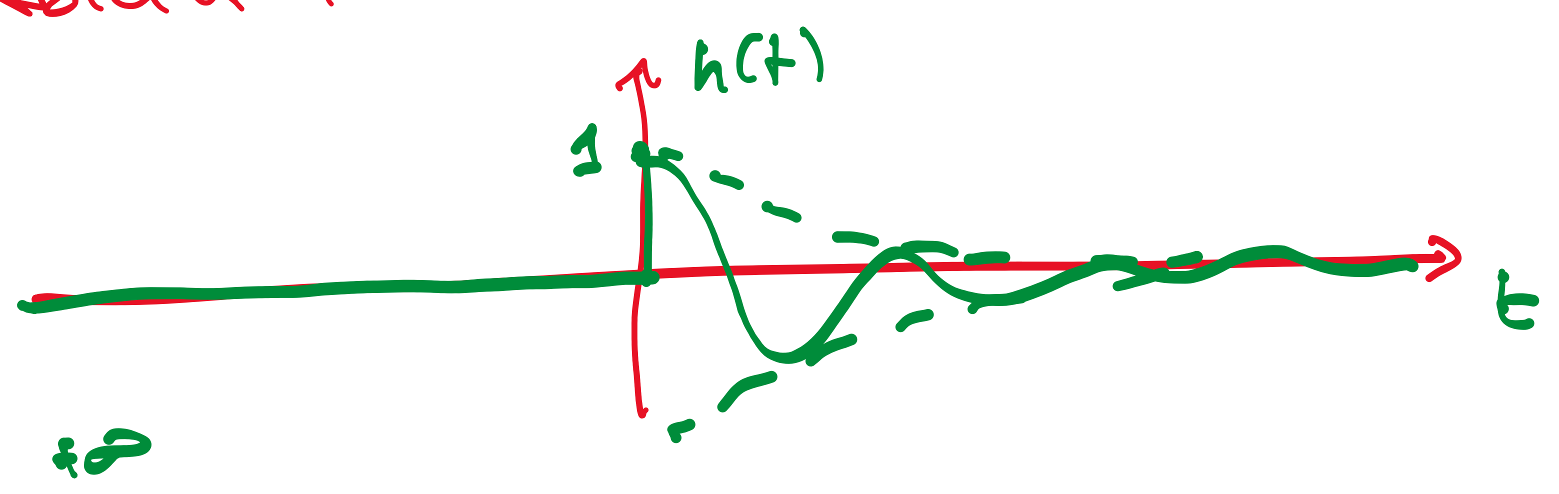
ATTIVO PER $n-k-1\geq 0$ OVVERO $k\leq n-1$

ES 1 STABILITÀ DI $h(n) = n\cos(\pi/4\, n)\, 1_0(n)$



NON BIBO STABILE PERCHÈ I VALORI DI $|h(n)|$ DIVERGONO

STABILITÀ BIBO CON $h(t) = e^{-t}\cos(2t)\,1(t)$



$$\int_{-\infty}^{+\infty} |h(t)|\, dt = L_h < \infty$$

$$L_h = \int_{0}^{+\infty} e^{-t}\, \underbrace{|\cos(2t)|}_{\leq 1}\, \cancel{1(t)}\, dt$$

$$\leq \int_0^{\infty} e^{-t}\, dt = -e^{-t}\Big]_0^{+\infty} = 0-(-1) = 1 < \infty$$