Le10

Wednesday, 22 March 2023 10:30

Es 1

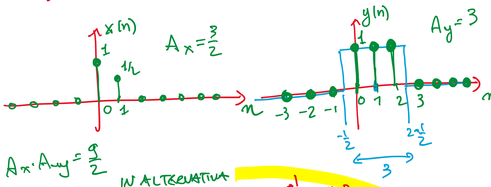
$x(n) = \delta(n) + \frac{1}{2}\delta(n-1)$

$y(n) = \text{rect}\left(\frac{n-1}{3}\right) \rightarrow \text{rect}\left(\frac{t-t_0}{a}\right) = \text{rect}\left(\frac{t-1}{3}\right)$

A) DISEGNARE $x(n)$ e $y(n)$ ✓

B) CALCOLARE $z(n) = x * y(n)$

C) CALCOLARE $v(n) = [x(n-3)] * [y(n+2)]$



$A_x \cdot A_y = \frac{9}{2}$

IN ALTERNATIVA

$y(n) = 1$ per $\frac{3}{2}^{-1} < \frac{n-1}{3} < \frac{3}{2}^{+1}$

$-\frac{1}{2} < n < \frac{5}{2} = 2{,}5$

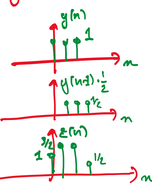
$0 \le n \le 2$

$z(n) = x * y(n)$

$= \left[\delta(n) + \frac{1}{2}\delta(n-1)\right] * y(n)$

LINEARITÀ $= \delta * y(n) + \frac{1}{2}\delta(n-1) * y(n)$

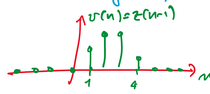
EL. NEUTRO $= y(n) + \frac{1}{2}y(n-1)$



$A_z = 1 + 3 \cdot \frac{1}{2} = \frac{9}{2}$

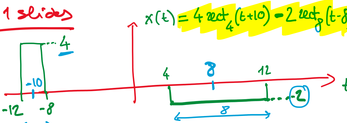
$v(n) = x(n-3) * y(n+2) = x * y(n-3+2)$

$= x * y(n-1) = z(n-1)$

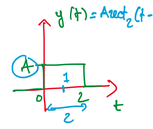


ES 1 slides

$x(t) = 4\,\text{rect}_4(t+10) - 2\,\text{rect}_8(t-8)$



$y(t) = A\,\text{rect}_2(t-1)$



CALCOLARE E DISEGNARE $x * y(t)$

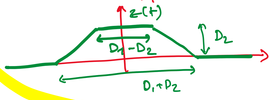
$A_x = 16 - 16 = 0$

$A_y = 2A$

$A_{x*y} = 0$

REGOLA TRAPEZIO $\quad \text{rect}_D(t) = \text{rect}\left(\frac{t}{D}\right)$

$z(t) = \text{rect}_{D_1} * \text{rect}_{D_2}(t) \qquad D_1 \ge D_2$



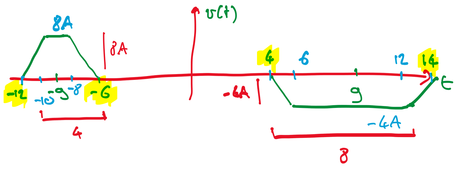
$x * y(t) = v(t)$

$= \left[4\,\text{rect}_4(t+10) - 2\,\text{rect}_8(t-8)\right] * \left[A\,\text{rect}_2(t-1)\right]$

$= 4A\,\text{rect}_4(t+10) + \text{rect}_2(t-1)$

$-2A\,\text{rect}_8(t-8) * \text{rect}_2(t-1)$

$= 4A\,\text{rect}_4 * \text{rect}_2(t+8) - 2A\,\text{rect}_8 * \text{rect}_2(t-9)$



ES3.A

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

POSSIAMO ESPRIMERE $z(t)$ COME CONVOLUZIONE $z(t) = x * y(t)$?

SE-SÌ, COSA SONO $x(t)$ E $y(t)$?

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

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

$y(t) = \sin(t)$

ES 2B

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

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

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