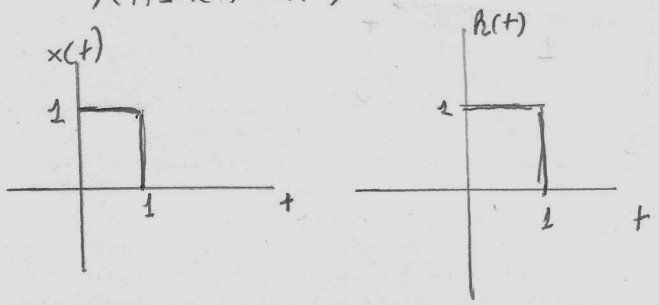
Alexi Alves - 398611 e Gustavo Bezerra Fechine - 397269

Lista 6:

1) Esboçar graficamente a convolução:

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

a)



$$y(t) = \int_{-\infty}^{\infty} h(\tau)\, x(t-\tau)\, d\tau$$

$$= \int_{-\infty}^{\infty} x(\tau)\, h(t-\tau)\, d\tau$$

P/ $t \leq 0$.

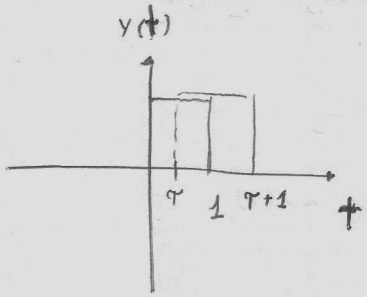
$$y(t) = \int_{-\infty}^{\infty} x(\tau)\, h(t-\tau)\, d\tau = 0$$

P/ t / $0 < t \leq 1$

$$y(t) = \int_{0}^{t} d\tau = t$$

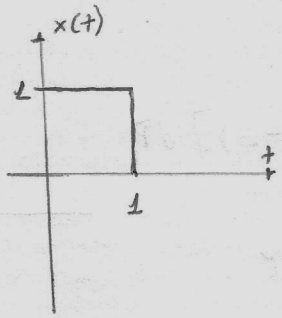
P/ $t > 1$

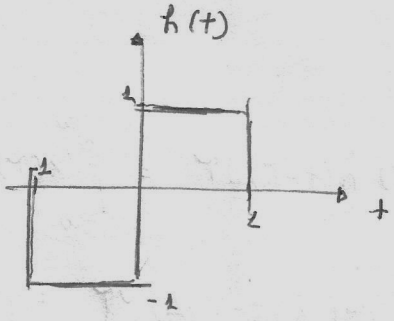
$$y(t) = \int_{-\infty}^{+\infty} x(\tau) \cdot h(t-\tau)\, d\tau = 0$$



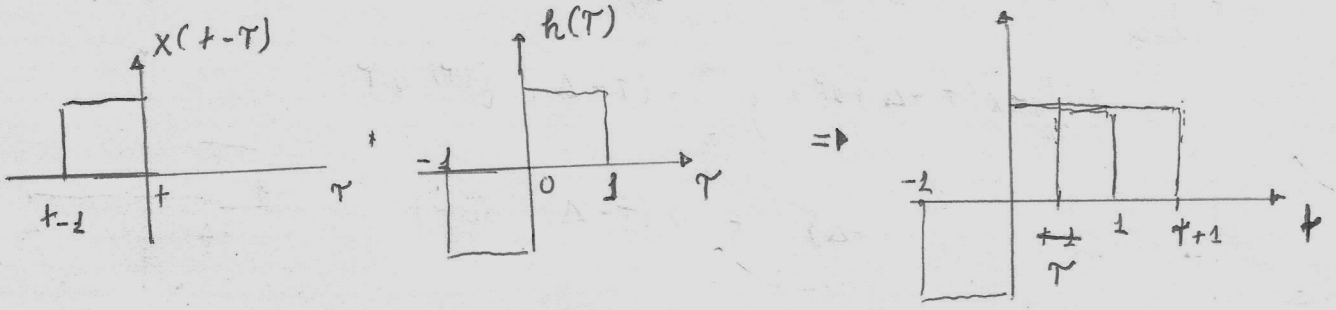
$$y(t) = \begin{cases} 0, & t \leq 0 \\ t, & 0 < t \leq 1 \\ 0, & t > 1 \end{cases}$$

b)

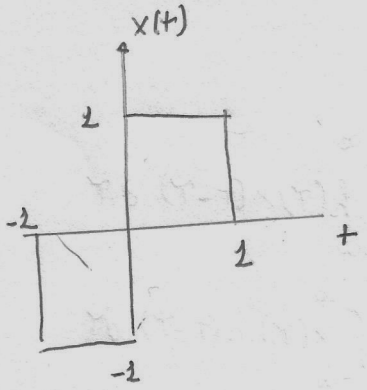


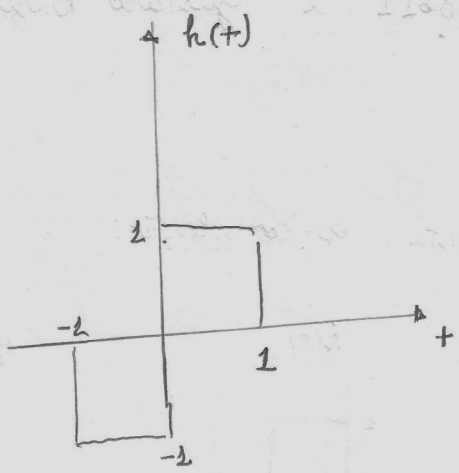


$$y(t) = \int_{-\infty}^{\infty} x(\tau)\, h(t-\tau)\, d\tau = \int_{-\infty}^{\infty} h(\tau)\, x(t-\tau)\, d\tau$$

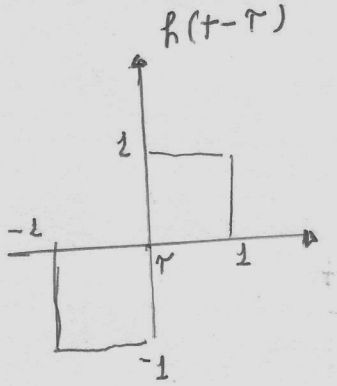


c)

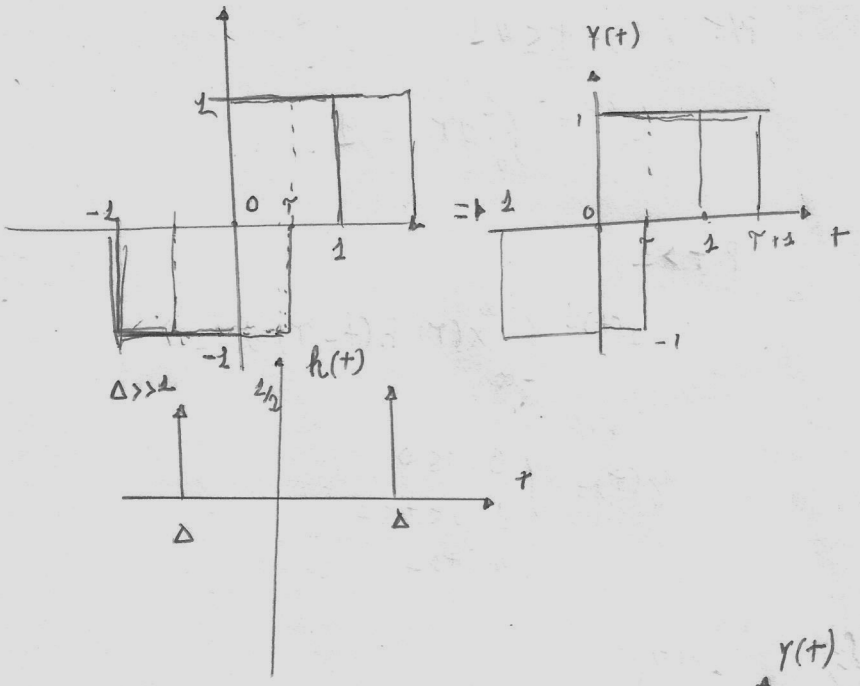




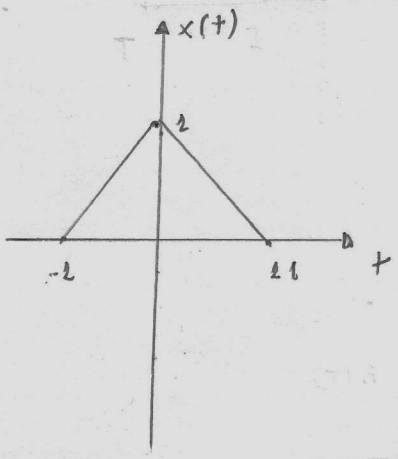
$$y(t) = \int_{-\infty}^{+\infty} x(\tau)\, h(t-\tau)\, d\tau$$



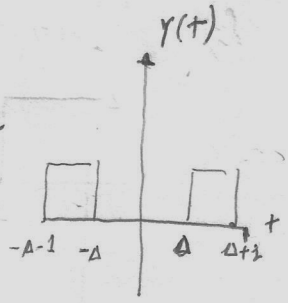
logo a convolução é



d)



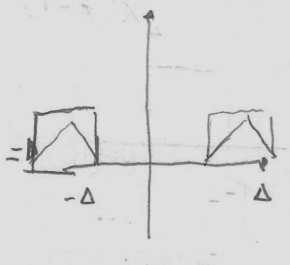
$$y(t) = \int_{-\infty}^{\infty} x(\lambda)\, h(t-\lambda)\, d\lambda = \int_{-\infty}^{\infty} x(\lambda)\,[\delta(t+\Delta-\lambda) + \delta(t-\Delta-\lambda)]\, d\lambda$$



$$= \int_{-\infty}^{\infty} x(\lambda)\,\delta(t-\lambda+\Delta)\, d\lambda + \int_{-\infty}^{\infty} x(\lambda)\,\delta(t-\lambda-\Delta)\, d\lambda$$

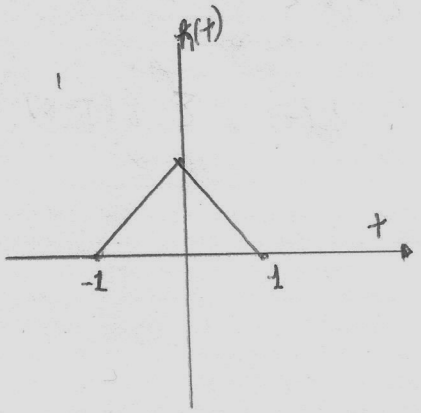
$$= \int_{-\infty}^{\infty} x(t+\Delta-\lambda)\,\delta(\lambda)\, d\lambda + \int_{-\infty}^{\infty} x(t-\Delta-\lambda)\,\delta(\lambda)\, d\lambda$$

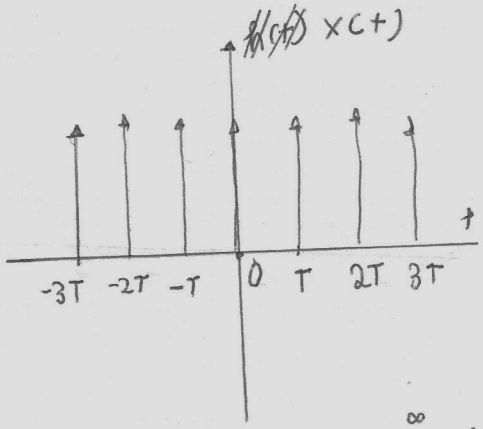
$$= \int_{-\infty}^{\infty} x(t+\Delta)\,\delta(\lambda)\, d\lambda + \int_{-\infty}^{\infty} x(t-\Delta)\,\delta(\lambda)\, d\lambda$$



$$= x(t+\Delta) + x(t-\Delta)$$

2)



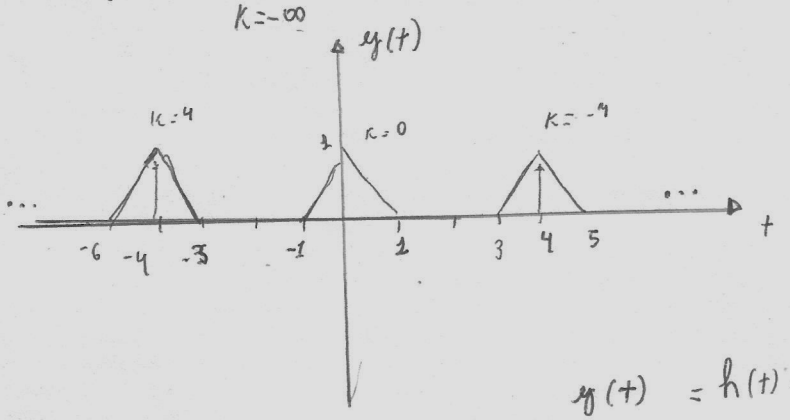


$$x(t) = \sum_{K=-\infty}^{+\infty} \delta(t-KT)$$

$$y(t) = h(t) * x(t) = h(t) * \sum_{k-\infty}^{\infty} \delta(t-kT)$$

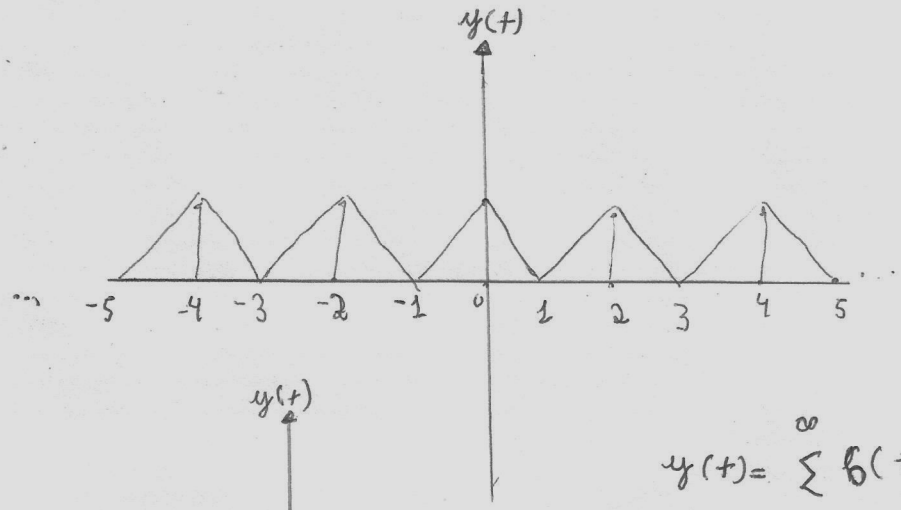
a) $y(t) = x(t) * h(t)$ Para cada T

$T=4$ $\quad y(t) = \sum_{K=-\infty}^{+\infty} h(t) * \delta(t-4K)$



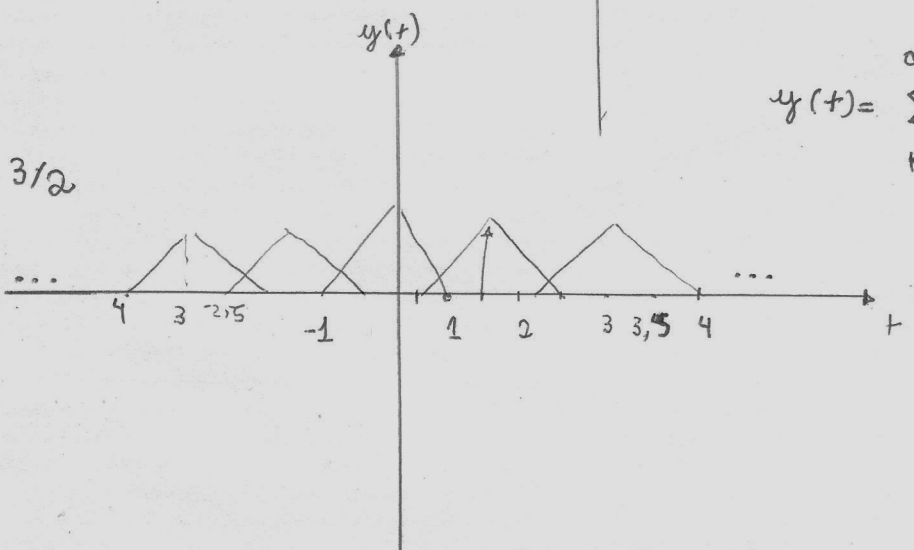
$$y(t) = h(t) * \sum_{K=-\infty}^{+\infty} \delta(t-2k)$$

b) $t=2$

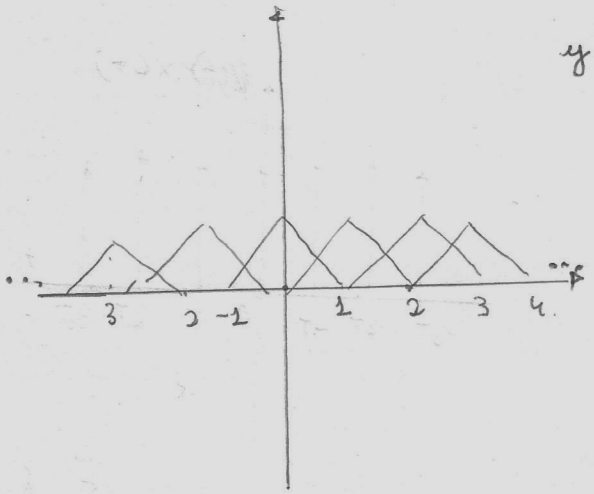


$$y(t) = \sum_{K=-\infty}^{\infty} \delta(t-3/2K) * h(t)$$

c) $T=3/2$



$d = T = 1$



$$y(t) = h(t) * \sum_{k=-\infty}^{\infty} \delta(t-kT)$$

$$= h(t) * \sum_{k=-\infty}^{+\infty} \delta(t-k)$$