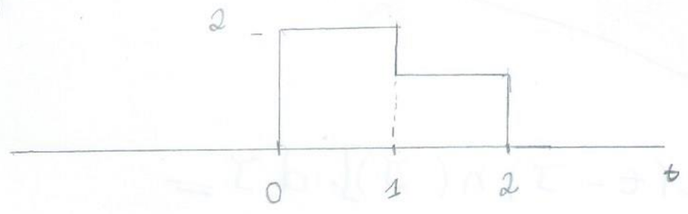
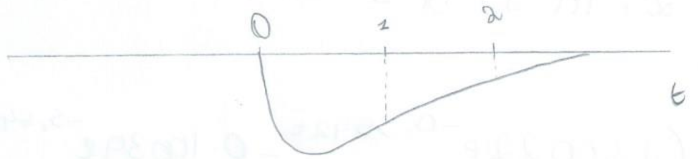
② d) Convolução

$$\int_{-\infty}^{\infty} [\underbrace{u(t-\tau) \cdot h(\tau)}_{\text{Propriedade comutativa}}] \cdot d\tau \quad ; \text{ Onde}$$

$u(t)$

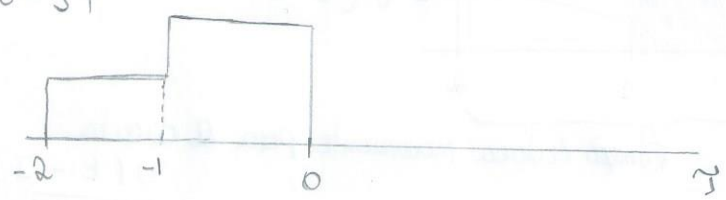


$h(t)$

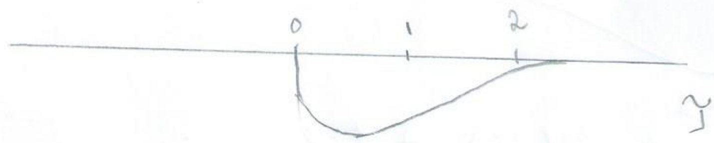


→ Passando para o domínio τ

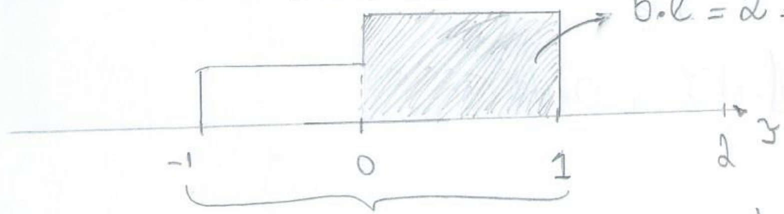
$$\overbrace{u(t-\tau)}^{\text{A REFLEXÃO DO GRÁFICO ACONTECE JUSTAMENTE PELO } (t-\tau)}$$



$h(\tau)$



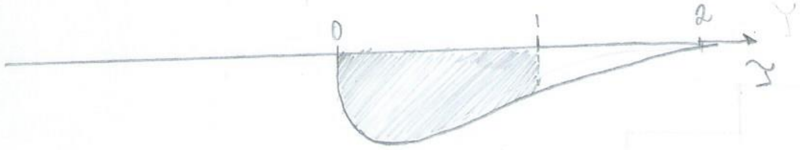
→ Variando t entre: $0 < t \leq 1$



$b.l = 2 = A$

Fumao que desloca para a direita (Justamente por $u(t - \tau)$)

VARIANDO



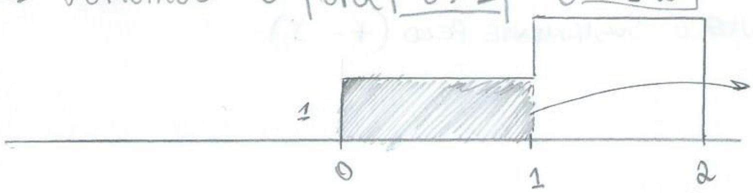
$$\int_0^t [\underbrace{u(t-\tau)}_{2}\, h(\tau)] . d\tau =$$

integral utilizada na convolução →

$$\int_0^t 2 . h(\tau) . d\tau =$$

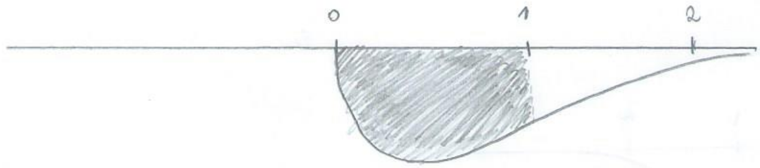
$$Y_1 = 2.(1.60022e^{-0.3542t} - 0.10039e^{-5,6457t} - 1.4998$$

→ Variando t para $\boxed{t > 1}$ e $\boxed{t \leq 2}$



$b.l = 1$

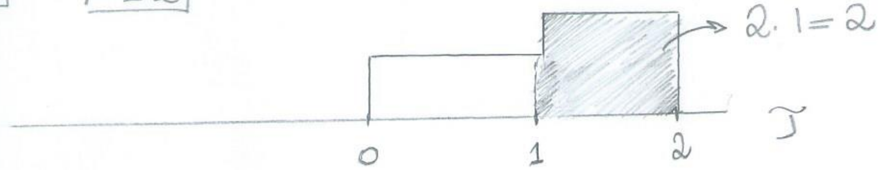
Função desloca novamente para a direita $u(t - \tau)$, onde $\boxed{t > 1}$

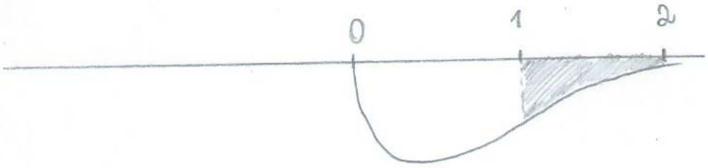


$$\int_0^{t-1} 1 . h(\tau) . d\tau =$$

$$Y_2 = 1.(1.60022e^{-0.3542(t-1)} - 0.10039e^{-5.6457(t-1)} - 1.49983$$

Ainda para $\boxed{t>1}$ e $\boxed{t\le 2}$

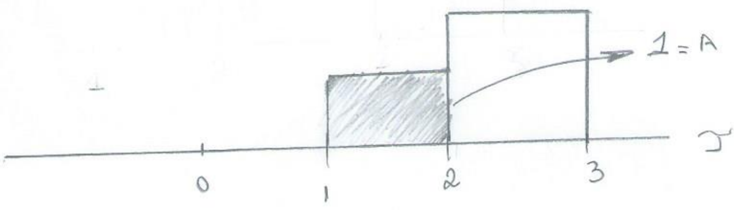


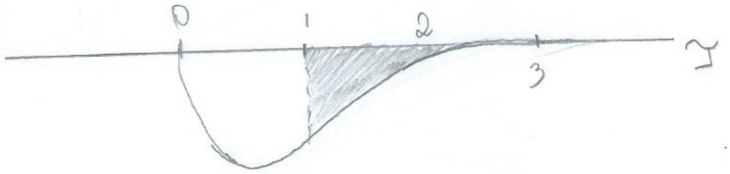


$$\int_{t-1}^{t} 2 \cdot h(\tau) \cdot d\tau =$$

$y_3 = 2(1.60022(e^{-0.3542t} - e^{-0.3542*(t-1)}) - 0.10039(e^{-5.6457t} - e^{-5.6457*(t-1)}))$

$\boxed{1 \le t < \infty}$





$$\int_{t-2}^{t-1} 1 \cdot h(\tau) \cdot d\tau =$$

$y_4 = 1.60022(e^{-0.3542\cdot(t-1)} - e^{-0.3542(t-2)}) - 0.10039(e^{(-5.6457(t-1))} - e^{(-5.6457\cdot(t-2)}$

Ou seja:

$y_{cdc} = y_1 * (u(t) - u(t-1)) + y_2 * (u(t-1) - u(t-2)) + y_3 * (u(t-1)) + y_4 * u(t-2)$