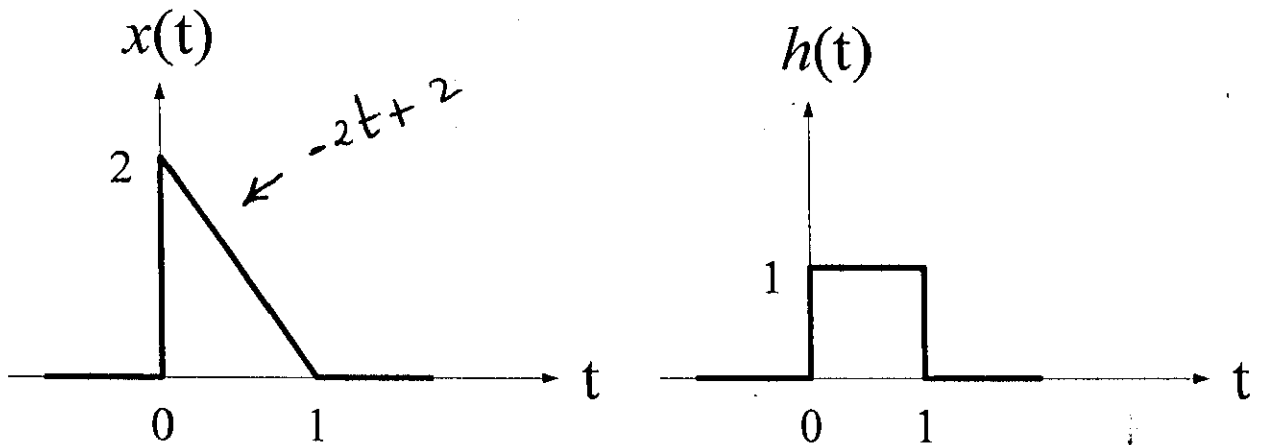
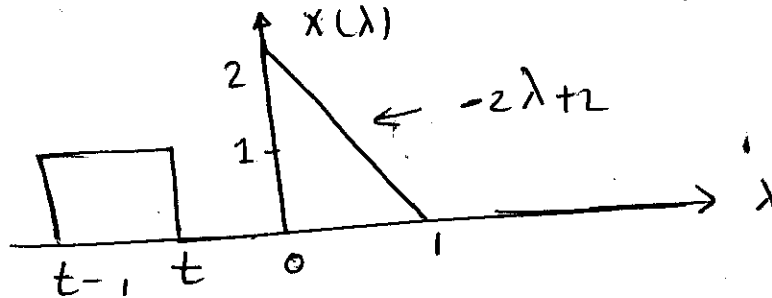


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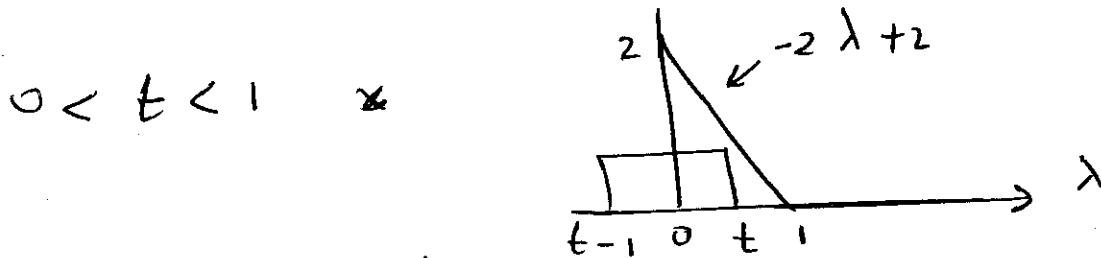
If the signals  $x(t)$  and  $h(t)$  are shown below



Evaluate the convolution  $x(t)*h(t)$  ?



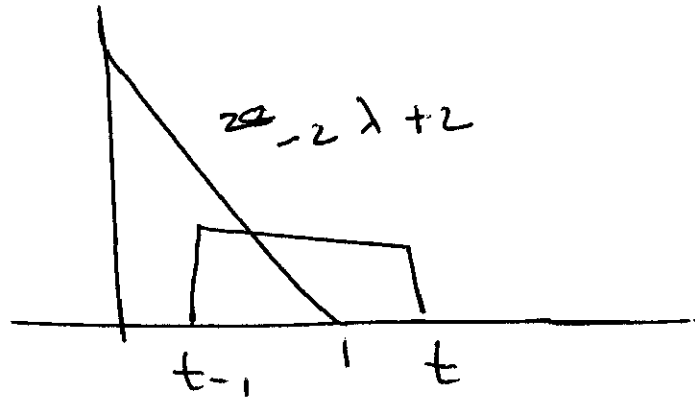
$t < 0$   $x(t) * h(t) = 0$  No overlapping



$$x(t) * h(t) = \int_0^t (-2\lambda+2)(1) d\lambda = -2 \frac{\lambda^2}{2} + 2\lambda \Big|_0^t$$

$$= -t^2 + 2t$$

$$\underline{1 \leq t \leq 2}$$

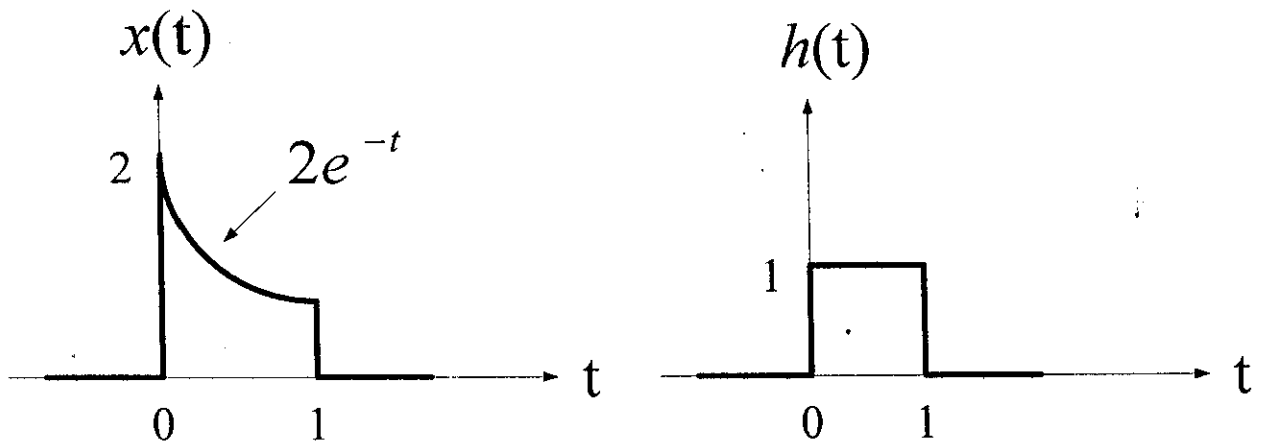


$$\begin{aligned} x(t) * h(t) &= \int_{t-1}^1 \cancel{-2\lambda} (-2\lambda + 2) d\lambda \\ &= t^2 - 4t + 4 \end{aligned}$$

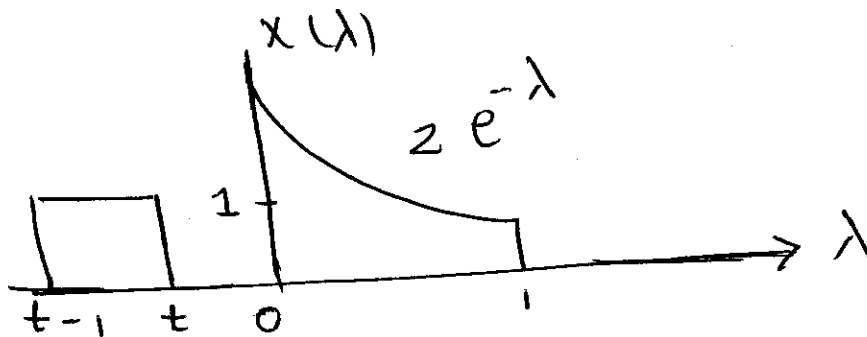
$$t > 2 \quad x(t) * h(t) = 0 \quad \text{No overlapping}$$

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If the signals  $x(t)$  and  $h(t)$  are shown below

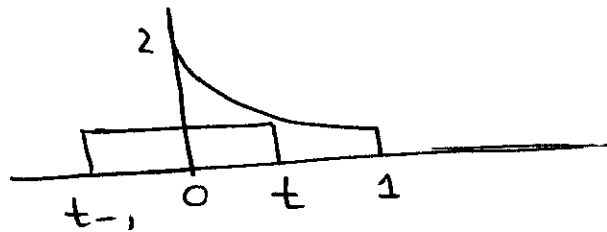


Evaluate the convolution  $x(t) * h(t)$  ?



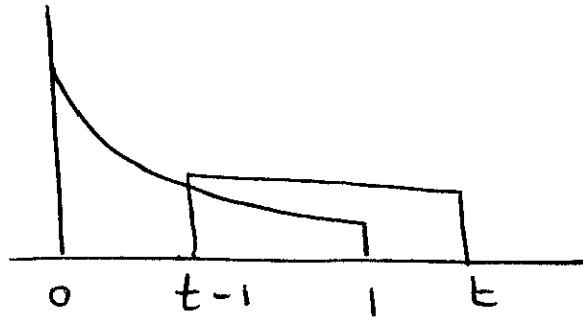
$t < 0$   $x(t) * h(t) = 0$  (No overlapping)

$0 < t < 1$



$$\begin{aligned}
 x(t) * h(t) &= \int_0^t (2e^{-\lambda})(1) d\lambda = 2 \frac{e^{-\lambda}}{-1} \Big|_0^t \\
 &= -2 [e^{-t} - e^0] = 2 [1 - e^{-t}]
 \end{aligned}$$

$$1 \leq t \leq 2$$



$$\begin{aligned}
 x(t) * h(t) &= \int_{t-1}^1 (2e^{-\lambda})(1) d\lambda = -2e^{-\lambda} \Big|_{t-1}^1 \\
 &= -2 [e^{-1} - e^{-(t-1)}] \\
 &= \cancel{2 [e^{-1} - e^{-t}]} \\
 &= 2 [e^{-(t-1)} - e^{-1}]
 \end{aligned}$$

~~$$t > 2$$~~

$$t > 2$$

$$x(t) * h(t) = 0$$

no overlapping.