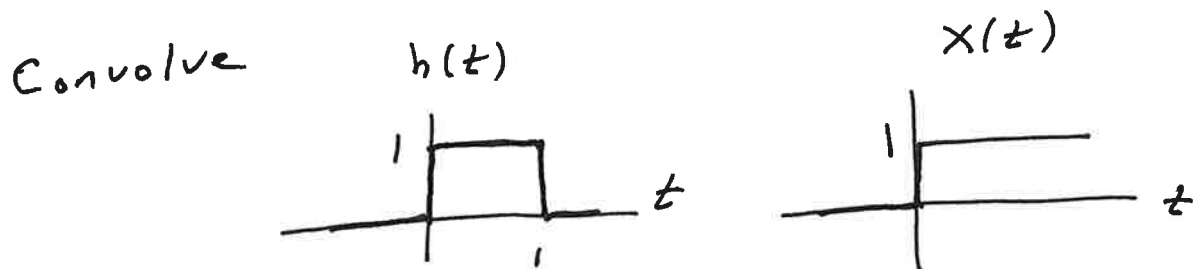
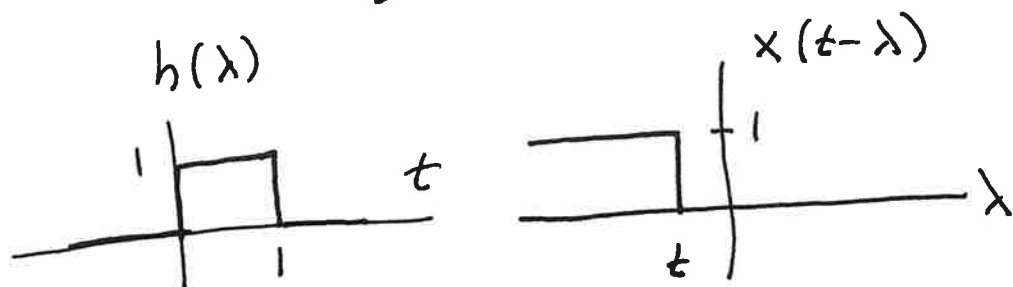


Continuous-Time Convolution Example

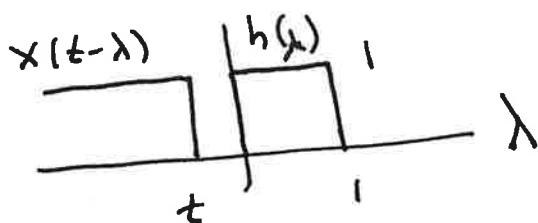
Prof. Brian Evans UT Austin Dec. 4, 2025



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

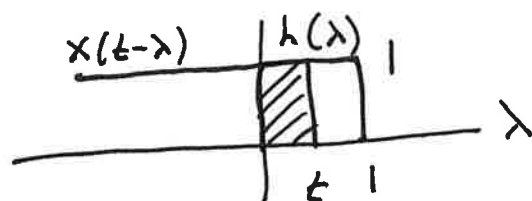


Case I: No overlap



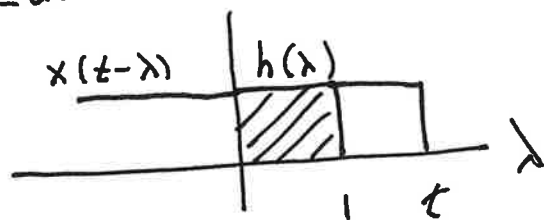
$$y(t) = 0 \text{ for } t < 0$$

Case II: Partial overlap

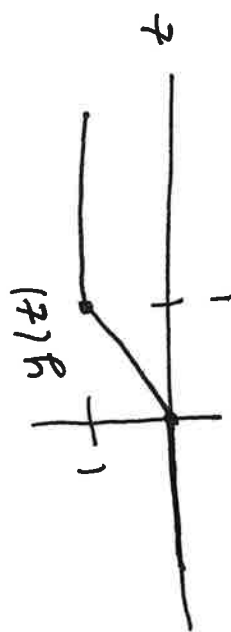


$$y(t) = \int_0^t d\lambda = \lambda \Big|_0^t = t \text{ for } 0 \leq t < 1$$

Case III: Complete overlap



$$y(t) = \int_0^1 d\lambda = \lambda \Big|_0^1 = 1 \text{ for } t \geq 1$$



$$y(t) = \begin{cases} 0 & \text{for } t < 0 \\ t & \text{for } 0 \leq t < 1 \\ 1 & \text{for } t \geq 1 \end{cases}$$