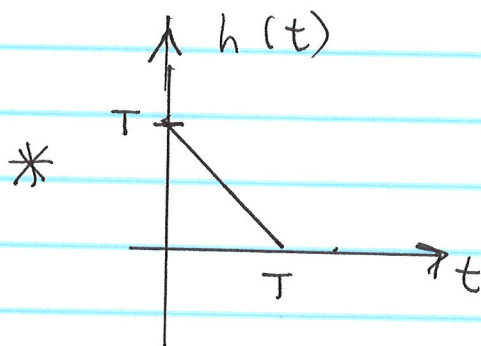
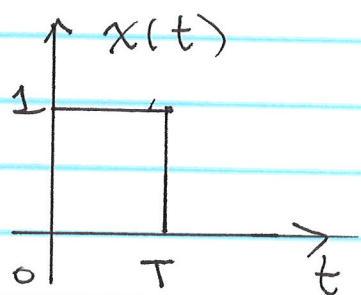


Convolution Result: "Rectangle" convolved with "Triangle"

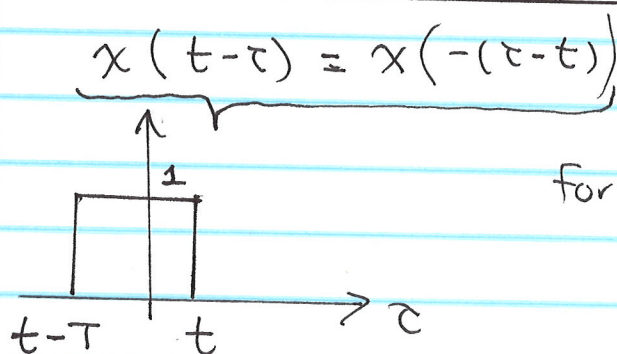


$$x(t) = \text{rect}\left(\frac{t - \frac{T}{2}}{T}\right)$$

$$h(t) = (T-t) \text{rect}\left(\frac{t - \frac{T}{2}}{T}\right)$$

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

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



$$\text{for } \left. \begin{array}{l} t > 0 \\ t-T < 0 \\ t < T \end{array} \right\} 0 < t < T$$

$$y(t) = \int_0^t (T-\tau) d\tau = -\frac{(T-\tau)^2}{2} \Big|_0^t = -\frac{(T-t)^2}{2} + \frac{T^2}{2}$$

for $T < t < 2T$:

$$y(t) = \int_{t-T}^T (T-\tau) d\tau = -\frac{(T-\tau)^2}{2} \Big|_{t-T}^T = +\frac{(2T-t)^2}{2}$$

for $t < 0$ or $t > 2T \Rightarrow y(t) = 0$

