Lecture 40, Wednesday, April 6, 2022

- More properties of convolution:
  - Start point: if $f(t) = 0$ for $t < t_{s,f}$ and $h(t) = 0$ for $t < t_{s,h}$, then

$$y(t) = f(t) * h(t) = 0 \text{ for } t < t_{s,f} + t_{s,h}$$

  - End point: if $f(t) = 0$ for $t > t_{e,f}$ and $h(t) = 0$ for $t > t_{e,h}$, then

$$y(t) = f(t) * h(t) = 0 \text{ for } t > t_{e,f} + t_{e,h}$$

  - Width: if $f(t)$ has width $T_f = t_{e,f} - t_{s,f}$ and $h(t)$ has width $T_h = t_{e,h} - t_{s,h}$, then

$$y(t) = f(t) * h(t) = 0 \text{ has width } T_y = T_f + T_h$$

- Convolution of $f(t)$ and $h(t)$:

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

  - Remember it is important to identify the transition points, which are points in time t, not in τ, where:
    - the expression for one, or both, of the functions changes (for piece-wise functions); or
    - the limits of integration change, due to one, or both, of the functions becoming zero.

