EECS 361
Homework #4

1. Section 3.2 Participation Activities
3.2.1: Measuring impulse response via a narrow pulse input.
3.2.2: Determining impulse response as the derivative of the step response.

2. Concept questions 3.2.1

3. Find the step response for a system with an impulse response of

h(t) = rect(t-.5)-rect(t-1.5)

4. Exercise 3.2.5

5. Section 3.3 Participation Activities
3.3.1: Methods to implement convolution.
3.3.2: Convolution of two rectangular pulses.
3.3.3: Convolution of two rectangular pulse.

6. Show that a system represented by a convolution integral is a linear system.

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

7. Section 3.4 Participation Activities
3.4.1: RC circuit response to rectangle pulse, graphical and analytical convolution.
3.4.2: Review of analytical convolution: rectangle and triangle.
3.4.3: Graphical convolution of rectangular pulse input and triangle impulse response.

8. Find and plot the convolution of the following functions.

a. x(t) = $\text{rect}\left(\frac{t-1}{2}\right)$ and h(t) =$\text{rect}\left(\frac{t-1}{2}\right)$

b. x(t) = 2 $\text{rect}\left(\frac{t-1}{2}\right)$ and h(t) =3 $\text{rect}\left(\frac{t-2}{4}\right)$

c. x(t) = 3 $\text{rect}\left(\frac{t-2}{4}\right)$ and h(t) =2 $\text{rect}\left(\frac{t-2}{2}\right)$

d. x(t) = 2*rect(t − .5) and h(t) =t ∗rect(t − .5) +u(t-1)

9. Let x(t) = $\text{rect}\left(\frac{t-10}{2}\right)$ and h(t)=$\text{rect}\left(\frac{t-20}{2}\right)$, find h(t)∗x(t) and plot. Repeat for x(t) = $\text{rect}\left(\frac{t-10}{2}\right)$ + $\text{rect}\left(\frac{t+10}{2}\right)$