EECS 360

Homework 5

1. a) Convolve $x(t)=\left(\frac{1}{T_0}\right) rect\left(\frac{t}{T_0}\right)$ with $h(t)=u(t)\frac{1}{RC}e^{-\frac{t}{RC}}$ to find the output y(t), for

a) T_0 = 0.05 and RC =0.3 Plot the result.

b) T_0 = 1 and RC = 0.3 Plot the result.

Confirm your answer with Approximate Impulse Response @
http://www.ittc.ku.edu/~frost/EECS_360/Mathematica-360/Impulse_Examples.cdf
Also look at Convolution with a Rectangular Pulse @
http://demonstrations.wolfram.com/ConvolutionWithARectangularPulse/

c) Is the result from part a) close to h(t), why?

d) Convolve $x(t)=\left(\frac{1}{T_0}\right) rect\left(\frac{t}{T_0}\right)$ with $h(t)=u(t-1)\frac{1}{RC}e^{-\frac{1}{RC}(t-1)}$ for T_0 =1 and RC =0.3 Plot the result.

e) What is the relationship between the results in parts b) and d) above?

2. Convolve $h[n]=.1(u[n]-u[n-10]$ with $x[n]=u[n]-u[n-10]$ Plot the result.
Confirm your answers with Discrete-Time Convolution. @
http://demonstrations.wolfram.com/DiscreteTimeConvolution/

3. Let x[n] = 0, 1, 2 for n = 1, 2, 1 and h[n] = 3, 2, 1 for n = 0, 1, 2. Convolve x(n) with h(n) and plot the result. Confirm your answer with Convolution Sum. @
http://demonstrations.wolfram.com/ConvolutionSum/

4. The system input, x(t)= $\frac{u(t-1)\exp(-(t-.5))}{\exp(-.5)} + rect(t-.5)$ and impulse response, h(t)=rect(t-.5), are given below. Find the system output. Hint: Use linearity and time invariance.