AV314 - Programming Assignment 2

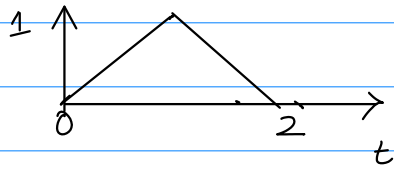
Out : 6/8/2018

Due : In 1 week - 13/08/2018

Representation / Simulation of signals and systems in Matlab

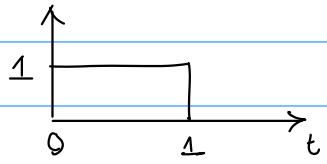
① Draw the function $\sin(1/t)$ for $t \in [0.02, 0.1]$ by hand (make a rough plot). This is just so that you have a baseline to compare your results with. Make a plot of $\sin(1/t)$ vs t in Matlab - your function should match the expected plot that you have drawn by hand before. How did you choose to represent $\sin(1/t)$? What was the sampling period.

② Suppose you are given an LTI system with impulse response $h(t)$ as shown.



You have to write a Matlab function that will take an appropriately sampled version x_n of a C.T signal $x(t)$ as an input argument and compute an approximation y_n of the output signal $y(t) = x(t) * h(t)$.

Test your function with $x(t)$ =



Does the function give an output y_n that matches with the $y(t)$ that you obtain by doing the convolution by hand?

③ Find out whether convolution satisfies the property

i.e if $y(t) = (x_1(t) + x_2(t)) * h(t)$

$= x_1(t) * h(t) + x_2(t) * h(t)$.

Suppose I have an extremely long duration signal $x(t)$ which needs to be filtered by a LTI sys. with a short duration impulse response $h(t)$. Can the above property be put to any use in this situation. If so, how?