

EE 327 Signals and Systems 1
Matlab Assignment 1
5 Points

Objective

To become familiar with creating signals in Matlab and then plotting them.

Continuous-Time Signals

You are to plot three different signals using Matlab.

- $x_1(t) = 2e^{-t/3}$
- $x_2(t) = 2\sin(2\pi ft + \pi/2)$ where $f = 2\text{Hz}$
- $x(t) = x_1(t)x_2(t)$

Use the subfigure command to create two separate plots on the same figure. In the upper region of this figure, plot $x_1(t)$ and $x_2(t)$ overlaying each other. In the lower portion of this figure, plot $x(t)$. Only plot these signals on the range 0 to 10 seconds. For the upper plot, create a legend to distinguish between the two traces. Make sure you use some distinguishing feature to delineate the two different traces (for example, using different line styles or colors).

To approximate continuous-time waveforms using discrete data points, use a “fast” sampling rate (i.e. much faster than the Nyquist rate). Your continuous-time signals should look like they are continuous in time (i.e. they should be smooth with no distinguishable “jagged edges” – for example, a sine wave should look like a sine wave, as if you were to draw it by hand).

Discrete-Time Signals

You are to plot three different sequences using Matlab

- $x_1[n] = 2(0.6)^n$
- $x_2[n] = \sin\left(\frac{2\pi n}{N}\right)$ where $N = 8$ (this is the period)
- $x[n] = x_1[n]x_2[n]$

Use the subfigure command to create two separate plots on the same figure. In the upper region of this figure, plot $x_1[n]$ and $x_2[n]$ overlaying each other. In the lower portion of this figure, plot $x[n]$. Only plot these sequences on the range 0 to 20 samples.

On the upper plot, do not create a legend to distinguish the two traces, but instead plot the two traces with different markers.

What to Turn In

Turn in *only* the two resulting plots with a cover page. You do not need to turn in any code.

Helpful Hints

- Exponentials of the form e^x use the Matlab function `exp()`
- π can be written in Matlab using `pi`
- You can get help on any function by typing `help function_name`
- Do not forget axis labels and titles on your plots
- Do not forget the cover sheet as described on the Matlab assignments webpage
- What sampling rate is necessary to make the “continuous-time signals” look smooth?