

ECE 410 Introduction to Signal Processing
Matlab Project I
Fall 2003

Issued: Friday, August 29, 2003

Due: Monday, September 8, 2003

The purpose of this project is to reinforce your understanding of discrete-time convolution and the properties of discrete-time LTI systems.

Each student must do his or her own work on this project, however you may ask other students for advice. As stated in the guidelines given in the ECE 410 course information packet, you should identify any students you collaborate with. Your writeup must include all of the analytical (*i.e.*, pencil/paper) work, Matlab plots and code, and relevant explanations. A list of guidelines for preparing the writeup of this project are given below.

- The report must be neatly handwritten or typed, and all pages must be numbered.
- All plots must be neatly annotated with x-axis and y-axis labels and a title. Any graph not labeled will be considered not handed in.
- I will not spend time trying to figure out which graphs are for which problems. When referring to plots in the text, I recommend doing at least one of the following:
 - use figure numbers, e.g., “Figure 1 is a plot of the signal $x[n]$.”
 - cite the page number they are on, e.g., “The figure at the top of page 4 is a plot of $x[n]$.”
- All Matlab code must be well-documented and should be included in an appendix at the end of the report.

Note: If you are rusty on using Matlab, you may want to do the Tutorial on Matlab for Signals and Systems in Section 1.1 of Buck, Daniel & Singer.

Properties of DT LTI Systems

Do all of the exercises in Section 2.4 of *Computer Explorations in Signals and Systems* by Buck, Daniel, & Singer. Your writeup should include answers to all of the questions in the book and any other observations you make as you complete the exercises.

Additional instructions:

When plotting sequences using `stem`, you should always plot versus the appropriate time vector. For example, to plot $x_1[n]$ in part a, use `stem(nx1, x1)`. If you compute the result of a convolution, you will have to determine the appropriate time (n) vector for plotting against. This should be easy to do (check your ECE 320 notes if you don't remember convolution).