332:521 – Digital Signals and Filters
Computer Experiment 1 – Due September 16, 2010

Please prepare your reports in PDF format using LaTeX or Word and email them to me at orfanidi@ece.rutgers.edu.

All the C and MATLAB routines contained in the text may be obtained from the web page: www.ece.rutgers.edu/~orfanidi/intro2sp/#progs. In preparing your reports, please observe the following guidelines:

a. Please include a *discussion section* on the purposes and results of the experiment (reports without discussion will not be accepted.)

b. Any numerical and/or theoretical calculations and graphs must be presented in the discussion section.

c. Source code must be attached as an Appendix *at the end* of the report. (Please never attach numerical data listings – unless asked.)

d. Please work alone. Collaboration with other students is not allowed.

This computer experiment deals with sampling and quantization issues. Please do the following:

1. Do book Problem 1.8 dealing with aliasing in the time domain. (See book Examples 1.4.4 and 1.4.6 for some similar examples.)

2. Do Problem 1.17 dealing with analog antialiasing prefilter design. (You will need to do Problems 1.15 and 1.16 first.)

3. Reproduce all the results and graphs of Example 1.6.3 dealing with the sampling and staircase reconstruction of a sinusoidal signal.

4. Reproduce all the results and graphs of Example 2.5.1 dealing with the impact of dither on the quantization of a low-amplitude sinusoid and the removal of quantization distortions. (You may use the MATLAB routine dtft.m of the text or the built-in function freqz.m to calculate the required spectra.)