

Lab07 Notes
Sampling, Convolution and FIR Filtering
October 30, 2005

Your Lab Report should give explanations wherever “Comment”, “Explain” are mentioned or questions are asked.

1 Pre-Lab

- (1) Read Section 1.1, 1.2, 1.3.
Do the simple problem of equation (2) using *firfilt*. **Comment.**

- (2) Using **con2dis** GUI
Do Section 1.4 Sampling & Aliasing Demo. Make sure you use *Show all Plots* under the Plot Options.
Also under Plot Options, use *Set Line Width* as you see fit.

- (3) Verify that you are seeing $X(e^{j\omega}) = \frac{1}{T} \sum X_c\{j(\Omega - k\Omega_s)\}$. **Explain.**
What is the formula for getting $y(t)$?

- (4) Using **dconvdemo** GUI.
Do Section 1.5 Discrete-time Convolution using $x[n]$ and $h[n]$ as shown in Figure 2.

- (5) Do Section 1.6, without using *firfilt*. Explain as in (c).

2 Warm-up

- (1) Do Section 2.1. Sampling & Aliasing. **Explain.**

- (2) Do Section 2.2 Discrete-Time Convolution. **Explain.**

- (3) Do Sections 2.3, 2.4 Filtering a Signal.

- (4) Do Section 2.5 Filtering Images: 2-D Convolution.
Explain the effects on the resulting image when using filter *bdiffh* and *bdiffh'*.
Note that you can use `colormap(gray)` to get grey toned images.

Lab Exercises: FIR Filters

- (1) Do 3.1, 3.1.1 Deconvolution Experiment for 1-D Filters.

- (2) Do 3.1.3. **Explain.**

- (3) Do 3.2.1 **Explain.**

- (4) Do 3.2.2 **Explain.**