

MAE 143 A: Signals and Systems.

Homework #5 (Matlab practice).

Assigned May 5. Due May 19

The following exercises are intended for you to understand how different impulse responses will affect audio signals convolved with them. The corresponding files are all available in WebCT. You can have access to Matlab in EBU-II 203, 205, and 239. You can access the door codes going to www-accs.ucsd.edu/students/ and then click on [quicklinks>Account Look Up Tool](#). After that you need to search for the lab office numbers. If you have questions, please let us know.

1. Save the files `acoustic.wav`, `speedy01.wav` into the same folder in MATLAB where you store `fconv.m` and `eg_reverb.m`. Run the program with the following combinations:
 - (a) Audio input `speedy01.wav` and impulse response `cathedral.wav`
 - (b) Audio input `acoustic.wav` and impulse response `yeha.wav`

Each time you run `eg_reverb.m` you will obtain three plots. Please print the plots with this homework and answer briefly to the following questions:

What effect does convolution with $g(t)$ have on the music; i.e. what is different about the music after the convolution used in `eg_reverb.m`? Can you relate this effect to the shape of h ? What physical mechanism might give rise to an effect like this?

2. Load the file `proj4_data.mat` in the same directory in Matlab where you store the M file `fconv.m`. Both files can be downloaded from WebCT.
 - (a) Play the signal using Matlab's `soundsc` command. What do you hear?
 - (b) Filter the signal using the convolution operation `fconv.m` and the impulse response h stored in the data file. Play the resulting signal. Is there a difference? Can you identify the words?

Please plot the noisy signal, the filtered signal and the impulse response signal and attach it to the homework solution.