

EE 311
Assignment 03

January 27, 2017
Due: February 8, 2017

For this assignment you will need *BagPipes11025.wav* from the website. Enter the following program in Matlab and run it. The program plays the original wav file, waits for you to push a key, and plays a version of the wav file that has been processed by the difference equation given by:

$$y_n = 0.0817(x_n + x_{n-2}) + 1.7727y_{n-1} - 0.81y_{n-2}$$

A) Add lines to the m-file so that it plots the frequency response (magnitude only) of both the original file and the filtered file in two subplots on the same figure.

```
%DiffEq.m
wavName = 'BagPipes11025.wav';
[x fs] = audioread(wavName);
T = 1/fs;
y = zeros(length(x), 1);
for n = 3:length(y)
    y(n) = 0.0817*(x(n) + x(n-2)) ...
          + 1.7727*y(n-1) - 0.81*y(n-2);
end
player = audioplayer(x, fs);
play(player);
pause;
player = audioplayer(y, fs);
play(player);
```

B) Convert the difference equation to a transfer function in z and use Matlab to plot the frequency response of the transfer function (magnitude only).

Turn in your commented Matlab code along with the frequency response figures with appropriate labels.