**DSP Lab**   **Lab Assignment 7**

MATLAB GUI

1) Modify the class demo MATLAB GUI so that the frequency response of the filter is shown in a second subplot.   You can modify either version:

     filter_gui_example_ver1.m
     filter_gui_example_ver2.m

2) Create a MATLAB GUI for a second-order recursive filter with three slider controls that allows the user to change the (1) peak gain, (2) center frequency, and (3) bandwidth. The GUI should display the frequency response and pole-zero diagrams in separate subplots. Use the parametric transfer function given in the text book.
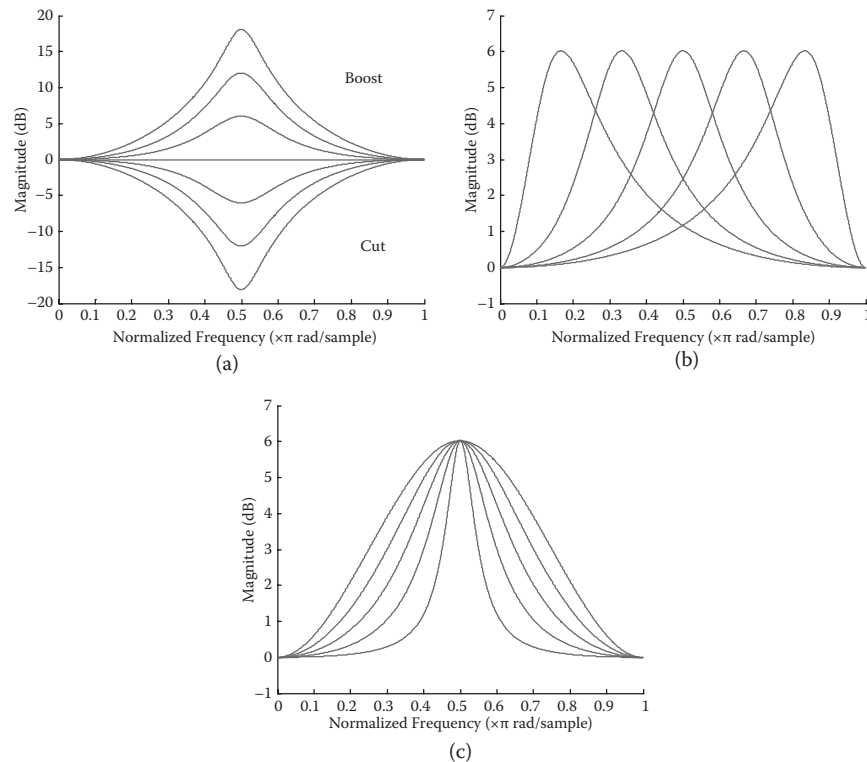
ALL-PASS SYSTEMS

3) Implement a first-order all-pass LTI system in real-time using PyAudio.
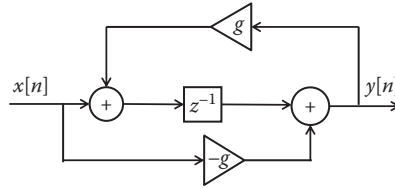
Note: you can verify your program runs correctly by comparing with Matlab using the same input data (you could write a version that reads input from a data file and writes output to another data file, and very that Matlab and Python produce the same result).

4) Implement an LTI notch filter using two sections of your all-pass filter. How do you determine and set the notch frequency? Can you use a noise input signal to experimentally verify that your filter is a notch filter?

5) Implement an LTI filter with two notches using several sections of your all-pass filter. How many sections are needed?

6) Implement the phasor audio effect using a periodically time-varying all-pass filter. Compare the audio effect to the flanger with the same LFO.

WHAT TO SUBMIT TO NYU CLASSES:

1) Matlab file (single self-contained file).
2) Matlab file (single self-contained file).
5) A plot of the frequency response of your system (as a pdf file).
6) Python file (single self-contained file).

Submit all files as a single zip file to NYU Classes under the 'Lab7' assignment.
All files and your written report document should be included in the zip file.
Name your file:
Lab7_1_NetID.m
Lab7_2_NetID.m
Lab7_5_NetID.pdf
Lab7_6_NetID.py
To ensure proper grading of your work, verify that your codes run without needing additional files. Do not use absolute paths like C:\\xxxx.wav or \usr\local\xxx.