EE4377

Digital Signal Processing Term Project

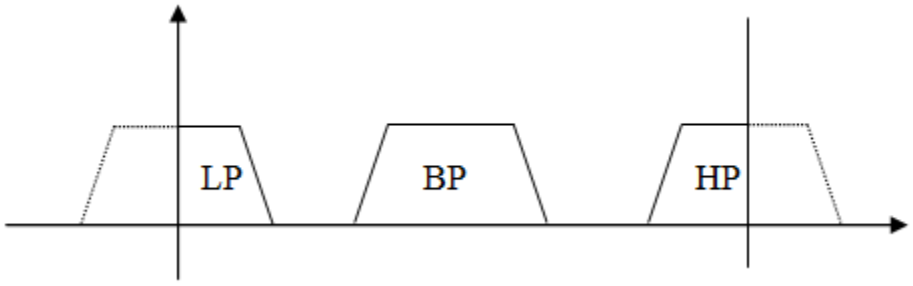
“Filter Design and Optimization”

Objective:

You will be designing proper FIR filters for Good Guys Cable, Inc. The company has specific requirements for design and testing. Each FIR filter must be represented properly. You can work alone or in groups of three.

Section A – FIR Filter Design Requirements:

In this section you will create three FIR filters, all with the same shape. Note that the bandwidth of the low and high pass filters will be one half that of the band-pass filter, as shown in the diagram.



Specifications for Low Pass Filter:

Passband Edge	1 kHz
Transition Width	250 Hz
Passband Ripple	< 0.1 dB
Stopband Attenuation	> 50 dB
Sampling Rate	20 kHz
Center Frequency	5 kHz

In your report you must include all of your calculations, window functions, transfer functions, magnitude and phase calculations and plots. Your plots must have proper labeling.

Section B – Testing FIR Filter Design:

You must test your filters using sine waves of different frequencies. You should include your test plots in your report.

Section C – Process and Deadline:

You need to follow the schedule and complete all tasks to get full credit.

Task	Deadline	Points
Submission Guidelines ▪ Create a Folder "YourLastName_FirstName_EE4377_P" ▪ Create two folders ✓ WORD ✓ MATLAB ▪ Create a WORD File "YourLastName_FirstName_EE4377_P" ▪ Create four .m files "LP.m", "HP.m", "BP.m", and "project.m" (You may have more .m files if that will make verification of your design easier) ▪ Make sure these files are located in your MATLAB folder ▪ When I run your "project.m" file it should show me your filters and verification plots. ▪ You must include following in your WORD file report ✓ impulse response calculations ✓ h1[n], w[n] and h[n] ▪ zip your top folder "YourLastName_FirstName_EE4377_P" and upload it to TRACS DROPBOX.	5/5/2015 or 5/14/2015	100