EE 123 DIGITAL SIGNAL PROCESSING, Spring 2009
Homework # 10, Due May 7, Thursday

1. Problem 7.25, Oppenheim and Schafer, 2nd ed.
2. Problem 7.31, Oppenheim and Schafer, 2nd ed.
3. Problem 7.32, Oppenheim and Schafer, 2nd ed.
4. Problem 7.36, Oppenheim and Schafer, 2nd ed.
5. The file `yolanda_noisy.mat`, located in bSpace under the "Assignments" tool, contains a 3-second refrain from the song "Donde Estas, Yolanda?" This sound track is recorded at 44.1 KHz, and is corrupted by high-frequency noise. Load this file into your Matlab workspace with the command `load yolanda_noisy`. This will create a vector, `yn`, that consists of the sampled values of the sound. Use the command `sound(yn,44100)` to play it. You should hear the high-frequency noise. You can run `fft` on `yn` to diagnose the frequency range where this noise occurs.

   Design an appropriate low-pass filter (either FIR or IIR) to filter out the noise, while preserving the essential frequency components of the song. To show your work, plot the spectrum of the signal before and after filtering. You should also describe the filter that you used and plot its frequency response. In addition, save the filtered signal to a .mat file (the command is `save`) and upload it on bSpace under Assignments.