EE-384 Classwork-5 Due: 30th June, 2015

Problem 1: Sound Processing with Matlab

Matlab provides many functions to work with sound:

- *wavread* : Read WAVE (.wav) sound file
- *wavwrite*: Write WAVE (.wav) sound file
- *wavrecord*: Record sound using PC-based audio input device (will be removed in a future release. Use *audiorecorder* instead)
- *sound*: sends audio signal to the speaker

a) Read and listen to the file 'test.wav'. What do you hear? What is the sampling frequency of the sound?

b) Plot the sound data versus time in seconds. Note that you will have to create a time vector based on the sampling rate and the number of samples in the data.

Problem 2: Amplitude Modulation (AM): http://en.wikipedia.org/wiki/Amplitude_modulation

Amplitude modulation is a technique used in electronic communication, most commonly for transmitting information via a radio carrier wave. Amplitude modulation works by varying the strength of the transmitted signal in accordance to the information being sent. We will simply demonstrate how it works in this problem.

a) Given that the sampling frequency is 500 Hz and the time vector varies from 0 to 1, create a 10-Hz sine wave. Let's call the wave we have just created the message signal. Plot the message signal versus time.

b) Use the message signal to modulate a 100-Hz carrier signal (using the Matlab's ***'ammod'*** function). Plot the modulated signal versus time.

c) Plot the frequency spectrum of the message signal and the frequency spectrum of the modulated signal using any method introduced in the last classwork. What are the differences between the two plots?

d) Demodulate the modulated signal using the Matlab's ***'amdemod'*** function. Plot the demodulated signal versus time and the frequency spectrum of the demodulated signal. Compare them to the plots of the message signal.