

Assignment 1: Amplitude and Angle Modulations

Communication 1: EC31203 (EC31001)
Max Marks: 40 Marks (will scaled to 5 Marks)

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1. Without using inbuilt function of amplitude modulator in MATLAB, write a MATLAB CODE for an amplitude modulator for modulating a carrier signal at certain center frequency with a message input (say an audio signal converted into .mat file) to generate an amplitude modulated signal. Plot both time domain and frequency domain plots of the amplitude modulated output for various values of modulation index (under modulated, critically modulated and over modulated). (6 Marks)
2. Without using inbuilt function of amplitude demodulator in MATLAB, write a MATLAB CODE for a coherent amplitude demodulator for demodulating the modulated output in part (1) and get back the message signal (in this case the audio signal) for various values of modulation indices (under modulated, critically modulated and over modulated). Use the inbuilt sound function to listen the demodulated output. Plot both the time domain and frequency domain plots of the demodulated output for various values of modulation indices (6 Marks)
3. Without using an inbuilt function of envelope detector in MATLAB, write a MATLAB CODE for a incoherent amplitude demodulator (envelope detector) for demodulating the modulated output in part (1) and get back the message signal (in this case the audio signal) for various values of modulation indices (under modulated, critically modulated and over modulated). Use the inbuilt sound function to listen the demodulated output. Plot both the time domain and frequency domain plots of the demodulated output for various values of modulation indices. Compare each of the results with the results obtained in part (2). (8 Marks)

4. Without using in-built function of modulator in MATLAB, write a MATLAB CODE for an frequency modulator for modulating a carrier signal at certain center frequency with a message input (say an audio signal converted into .mat file) to generate a frequency modulated signal. Plot both time domain and frequency domain plots of the frequency modulated output. (7 Marks)
5. Without using in-built function of demodulator in MATLAB, write a MATLAB CODE for a frequency demodulator for demodulating the modulated output in part (1) and get back the message signal (in this case the audio signal). Use the inbuilt sound function to listen the demodulated output. Plot both the time domain and frequency domain plots of the demodulated output.(7 Marks)
6. Use the FM modulator and FM Demodulator designed in part (1) and part (2) to do phase modulation and phase demodulation respectively. Plot the outputs of modulated and demodulated outputs in both time domain and frequency domains.(6 Marks).