

COMM 602: Modulation I

Project

Project group: Max. 4 students.

Project submission deadline: 20/4/2017

Presentation of the project: will be announced (each student in the group will be evaluated).

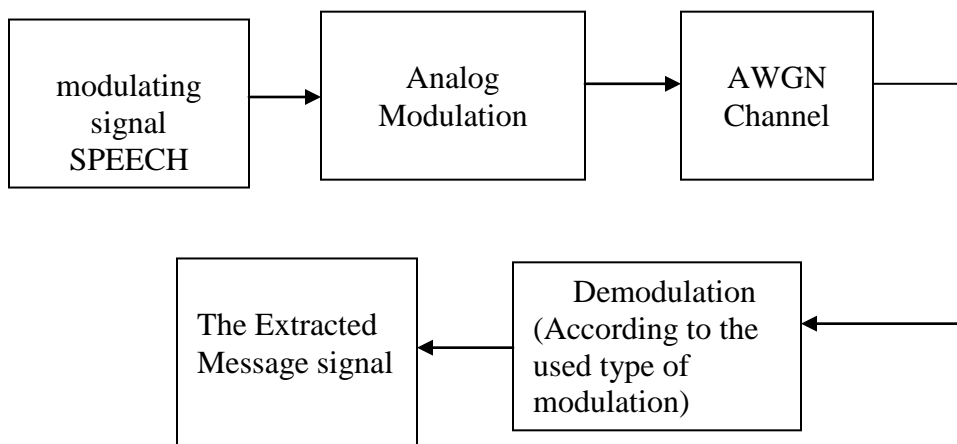
Tool: MATLAB: M-files are required (do not use Simulink or functions (ex: mod, demod), you have to generate the modulation types from equations given in the lectures.

General instructions:

- (1) The Project will be submitted as a hard copy. The m-file must be included in the appendix of the hard copy of the project.
- (2) The hard copy includes:
 - Block diagram of the simulated system.
 - The obtained results (FIGURES) as explained below.
 - Give comments on the obtained results.

Project Description

Simulate the following block diagram of a digital communication system.



- Download a speech signal as the modulating signal).
- Generate a carrier signal.
- Use the following types of analog modulations to modulate the modulating signal:

- Conventional AM - DSB (Bonus) -SSB or FM

- Generate a white Gaussian noise with zero mean (and of course with different variances (power) to adjust the SNR) and add this noise to the modulated signal.
- Use the suitable demodulator in the receiver (according to the used modulation type).

Required Results: [16 Marks]

- Plot the modulating signal in time and frequency domain [4 marks].
- Plot the modulated signal in time and frequency domain [4 marks]
- Plot the modulated signal plus noise in time and frequency domain at signal to noise ratios: -10 dB, 0 dB and 15 dB [4 marks]
- Plot the demodulated signal plus noise in time and frequency domain at signal to noise ratios: -10 dB, 0 dB and 10 dB [4 marks]

Note that we have to hear the speech signal at the receiver side (after demodulation) at the specified values of SNR.

Evaluation: 10 Marks on understanding code and results

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