Third year communication

Lab 1: Amplitude Modulation

Using matlab program:

1- Choose any audio signal with 20sec length.

i) Read the audio signal in matlab and then plot the signal waveform in time domain, the signal amplitude and phase in frequency domain.

2- Perform DSB-LC modulation

$$y(t) = (x(t) + A)\cos \omega t$$

ii) Choose reasonable values for $A\ and\ \omega$ to achieve DSB-LC modulation with your previous audio signal and explain how you choose them?

iii) Plot the modulated signal waveform in time domain and the modulated signal amplitude and phase in frequency domain.

iv) What do you think is a carrier's maximum modulation index without over modulation? What is the problem with the AM signal when it is over-modulated?

v) Compare between the bandwidth of the audio signal and the modulated one.

3- Perform DSB-LC demodulation

i) Do synchronous demodulation to obtain $x(t)$, then plot the final signal in time and frequency domain as previous.

ii) Hear the demodulated signal and compare it with the original one.

Are the two signals the same? Explain why?

- **Important note: For any two copied projects the grade is zero.**
- **Deadline: 14/12/2021**
- **The lab is individual.**
- **Submission is one pdf file containing simulation results, comments and codes at the end of the file.**