**ECE/EEE F311 Communication Systems (First Semester 2023-2024)**
**Lab-3 (Tuesday) (05-09-2023)**

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# Objectives

In this task, the objective is to study telephone tones and amplitude modulated signals.

# Task 1

(a) Amplitude modulate a carrier signal $c(t) = \cos 100\pi t$ using a message signal $m(t) = 4sinc(4\pi t)$, as $x(t) = c(t)m(t)$. Plot the time-domain and frequency-domain of output signal $x(t)$.

(b) Apply synchronous detector on $x(t)$ to recover back $m(t)$. Plot the output signal in time-domain.

(c) Do (a) and (b) if $m(t) = sin(10\pi t) + sin(20\pi t)$. **Use a single .m file using if conditions.**

multiply x(t) again by c(t) and then convolute it with sinc pulse

# Task 2

You listen various tones (dial, ringing, busy) using a telephone. These tones are generated with a combination of sine wave of various frequency. The tone plan is based on ITU-T Standard recommendation. The dial tone is a continuous tone of the addition of the frequencies 350 and 440 Hz. The ringing tone comprises frequencies of 440 and 480 Hz and a cadence of 2 seconds ON and 4 seconds OFF. The busy tone has frequency components of 480 and 620 Hz and a cadence of one half second ON and one half second OFF. Use this tone plan to generate **DIAL /RINGING/BUSY** tone. Use a speaker to listen **DIAL /RINGING/BUSY** TONE by applying command playsound. While generating the sinewave, mind its amplitude (take 0.1 volt). Use appropriate sampling frequency.

**Write the full code in a single .m file using if conditions to separate codes for busy, dial, and ringing tones. Use repmat function to generate** 60 **seconds of each tone type.**

sound(mt_dial, fs

repmat(mt,1,num_times)