

Lab – 6

Subject Code: EC303 P
Due Date: 20/10/20

Instructions:

1. Please mention legends, axis labels, titles etc in your plot/subplot for better understanding & clarity.
2. Observations pertaining to each plot is expected below the same.
3. Kindly number your answers correctly.
4. **NO PLAGIARISM.**
5. Ask any questions in class or via LMS so that it will be beneficial to all (us and you).

Questions:

1. Modulation & demodulation of Frequency Modulated Signal using MATLAB.
 - a) Generate and plot the sinusoidal waveform $S_1(t)$ with amplitude of 1V and frequency of 20 Hz.
 - b) Generate and plot the sinusoidal waveform $S_2(t)$ with amplitude of 1V and frequency of 100 Hz.
 - c) Set the sampling frequency to 1KHz and frequency deviation sensitivity (k_f) of FM modulator as 30Hz/V. Plot the frequency modulated signal, $S_3(t)$.
 - d) Using Carson's rule, find the FM bandwidth.
 - e) Now, if frequency deviation sensitivity (k_f) is varied from 10 Hz/V to 50 Hz/V, analyze the significance of this change on power and bandwidth of the FM signal.
 - f) Demodulate the frequency modulated signal, $S_3(t)$ and plot it (Use $k_f = 30$ Hz/V).
 - g) Analyze the effect of a frequency offset of 1 Hz, 5 Hz and 10 Hz at the receiving end on the demodulated FM signal.
2. Modulation & demodulation of Phase Modulated Signal using MATLAB.
 - a) Set phase deviation sensitivity (k_p) to 1.5 rad/V & plot the phase modulated signal, $S_4(t)$ using modulating signal, $S_1(t)$ and carrier signal, $S_2(t)$ as mentioned in part 1.
 - b) Demodulate the phase modulated signal, $S_4(t)$ and plot it.
 - c) Using Carson's rule, find the PM bandwidth.
3. Plot the frequency modulated signal, $S_3(t)$ and phase modulated signal, $S_4(t)$ in the same plot using subplots. Compare the two plots and write your observation.