Project (1)

Part I (frequency domain)

1. Generate a double tone sinusoidal signal (f1<4kHz and f2 > 4kHz) with a sampling frequency of 16 kHz.

2. Apply Fourier Transform to the signal in step "1" and sketch its spectrum and spectral density.
3. Apply a 3rd order LPF whose cut-off frequency is 4 kHz to the signal in step "1" and sketch the spectrum of the output. Compare the spectrum with that in "2". Comment
4. Input a voice signal to MATLAB (using any available method) for a duration of 5 seconds.
5. Repeat steps "2" and "3" on the voice signal.

Part II (time domain)

1. Generate a triple tone sinusoidal signal whose frequencies are 0.1, 2, 7 kHz and a sampling frequency of 20 kHz and a duration of 0.1 seconds.
2. Apply a LPF whose coefficients are given by

[1.0000 0.7303 0.5334 0.3895 0.2845 0.2077 0.1517 0.1108 0.0809 0.0591 0.0432 0.0315 0.023 0.0168 0.0123 0.009 0.0065 0.0048 0.0035 0.0026 0.0019 0.0014 0.001 0.0007] to the signal in step "1".

Find and sketch the output of the filter y(t).
3. Sketch the spectrum of the input and the output and compare them. Comment.