Communication Systems - I

(Simulation Assignments 2)

1. message signal $m_1(t) = \Delta\left(\frac{t+0.01}{0.01}\right) * - \Delta\left(\frac{t-0.01}{0.01}\right)$

The carrier frequency is 300 Hz. Write a program to generate SSB-SC modulation & demodulation.

Plot the message signal transmitted and received. in both time and frquency domain.

2. Let $m_2(t) = \alpha\, \text{sinc}(2t/T_a) + \text{sinc}(2t/T_a + 1) + \text{sinc}(2t/T_a - 1)$.

Design & implement QAM to modulate and demodulate two message signals $m_1(t)$ & $m_2(t)$. Assume Carrier frequency 300Hz.

3. FM and PM :- Use Matlab to build an FM modulation and demodulation. Use the same message signal $m_2(t)$.

Let $k_f = 50$ & $k_p = \pi$, carrier frequency $f_c = 300$ Hz.

4. Sampling theorem :- Construct a signal g(t) with two sinusoidal components of 1s duration, their frequencies are 1 & 3 Hz. Write a program to sample the signal at $f_s = 50$ Hz & reconstruct the signal from its samples. Show all the necessary plots.

5. Uniform Quantization :- Write a program to quantise an analog signal using L-uniform quantisation levels. Verify the SQNR (Signal to quantisation noise ratio) for different values of L is matching with its theoretical expression.