Digital Communication and Signal Processing Lab(304186)

Teaching Scheme:
Practicals: 4 Hrs/week

Examination Scheme:
PR: 50Marks
TW:50Marks

Digital Communication

Note :

1. Perform any 6 experiments from Group A and any 3 from Group B
2. Group A experiments are to be performed with hardware
3. Group B experiments are to performed using suitable software like Matlab, Octave, LabVIEW, Scilab etc.

Name of the experiment

Group A

1. Experimental Study of PCM and Companded PCM.
2. Experimental Study of DM and ADM.
3. Experimental Study of Pulse shaping, ISI and eye diagram
4. Experimental Study of Generation &detection of BPSK and QPSK.
5. Experimental Study of Generation &detection of BFSK.
6. Experimental Study of line codes (NRZ, RZ, POLAR RZ, BIPOLAR (AMI), MANCHESTER) & their spectral analysis.
7. Experimental Study of Detection of digital base band signal in presence of noise.
8. Experimental Study of Generation of PN Sequence and its spectrum.
9. Experimental Study of Generation &detection of DS-SS coherent BPSK & its spectrum.

Group B

1. Write a simulation program to implement PCM/ DM/ADM system.
2. Write a simulation program to study effect of ISI and noise in baseband communication system.
3. Write a simulation program to study Random Processes.
4. Write a simulation program for calculation and plotting the error probability of BPSK, QPSK, QAM. Comparison of theoretical and practical BERs.
5. Write a simulation program for implementation of any digital communication system.
6. Write a simulation program for Constellation diagram of any passband modulated signal in presence of noise.

Signal Processing

Instructions:

a) Minimum eight practical's to be performed.
b) Practical number 12 is mandatory.

Note: Practical 1 to 11 can be performed in any appropriate software like C/MATLAB/SCILAB etc.

1. Implement the sampling theorem and aliasing effects by sampling an analog signal with various sampling frequencies.
2. To study the properties of DFT. Write programs to confirm all DFT properties.
3. To study the circular convolution for calculation of linear convolution and aliasing effect. Take two sequences of length 4. Write a program to find 4 point circular convolution and compare the result with 8 point circular convolution to study aliasing in time domain.
4. (a) To find Z and inverse Z transform and pole zero plot of Z-transfer function.
   (b) To solve the difference equation and find the system response using Z transform.
5. To plot the poles and zeros of a transfer function when the coefficients of the transfer function are given, study stability of different transfer functions.
6. To study the effect of different windows on FIR filter response. Pass the filter coefficients designed in experiment 6 via different windows and see the effect on the filter response.
7. Design Butterworth filter using Bilnear transformation method for LPF and write a program to draw the frequency response of the filter.
8. To plot the mapping function used in bilinear transformation method of IIR filter design.(assignment may be given)
9. Effect of coefficient quantization on the impulse response of the filter using direct form I and II realization and cascade realization.(theory assignment)
10. Design and implement two stage sampling rate converter.
11. Computation of DCT and IDCT of a discrete time signal and comment on energy compaction density.
12. To implement at least one of the following operations using DSP Processor
    i) Linear and Circular convolution.
    ii) Low pass filter an audio signal input to DSK with FIR filter.
    iii) Low pass filter an audio signal input to DSK with IIR filter.
    iv) To generate sine wave using lookup table with table values generated within the programme.