Birla Institute of Technology & Science, Pilani, Rajasthan
First Semester 2019-2020
<u>Lab 7 (Tuesday)</u>

Course: EEE F311 Communication Systems
Instructor-in-Charge: S M Zafaruddin

Date: 24-09-2019

Objectives

- Reconstruction of sampled signals

- Generation of PCM signals

- PCM modulation and demodulation.

Create a folder named with your Institute ID and first name in the Desktop to save your work. Always write code in *.m file. Keep the codes with you for next week Lab sessions.

Task 1

1. Sample a sine wave $m(t) = \sin(2\pi 10t)$ using an impulse train. Plot the sampled signal using Matlab function 'stem'. Show the effect of sampling duration on the sampled signal.

2. Convert the analog message signal $m(t) = \sin(2\pi 10t)$ into a digital PCM signal to achieve an SQNR of 60dB. Plot the analog signal, quantized signals, and PCM signal. Use Matlab functions quantiz and uencode.

Task 2

1. Convert the analog message signal $m(t) = \sin(2\pi 10t)$ into a digital DM signal for a duration of 5sec. Plot the message signal, error signal, and demodulated signal. Use Matlab function 'stairs' to plot.

2. An analog signal has significant variation in the amplitude and has a peak amplitude of 4 volts and bandwidth 20 MHz. A uniform PCM is applied with a 16-bit encoder. Plot the SQNR (in dB) versus signal power $\overline{m(t)^2}$ in dB. Compare the result with compressed-SQNR using μ-law with $\mu = 255$. Recommend a commercial ADC for this signal. See the specification of different ADC in http://www.ti.com/data-converters/adc-circuit/products.html.

Backup Codes

1. Please keep backup of codes and figures by sending to your emails.

2. Make a zip/rar folder of your codes and figures in .jpeg format and upload to (ONLY ONCE): https://www.dropbox.com/request/D4HAPCNqIeczenvWMUBu

Project Task

We have started individual tasks with a bigger picture: to design an end-to-end simulator. Study the structure module in Matlab. Create a function of source signal as a structure and field values as the signals discussed so far: sinusoidal signal , rectangular pulse, audio file.