Communication Systems Lab
Lab Manual 13
Quantization of Analog Signals

Theoretical Background

In digital communication systems, the message signal is first sampled and quantized to be represented in the form of bits. In case of successful communication, the receiver is able to exactly reconstruct the quantized signal back. Therefore, under the perfect communication, the only source of noise in digital communication system is the quantization process. In this lab, we will compute the quantization noise corresponding to different number of quantization levels.

Laboratory Tasks

In this lab, we will use a speech signal as our message.

Task 1: Download the audio file available at *http://1drv.ms/1EpyLk2*. Save this audio file in your working folder. Use **audioread** function of MATLAB to read the speech signal and its sampling rate.

Task 2: Quantize the signal uniformly into 256, 128, 64, 32 and 16 levels. Playback the resulting quantized signal using **sound** command of MATLAB. Note down the number of levels L for which the sound is hardly intelligible.

Task 3: Compute the SNR using the formula given in the text book for all the cases in Task 2. At which SNR the signal is hardly intelligible? You can compute the signal power by calculating the mean of the squared magnitude of the signal.