Birla Institute of Technology & Science, Pilani, Rajasthan
First Semester 2021-2022
Lab-2 (PYTHON): Signals and Source Encoding

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

02-09-2021 THURSDAY (P1, P3): PYTHON

Instructions

- Create a folder named Lab in your shared folder.
- Create a Lab2 Sub-folder in the Lab folder. This folder will be your working directory.
- Develop .py file corresponding to each task.
- You can start the tasks in any order.
- Once all tasks are done, paste your codes and plots/results/observations/conclusions in a word doc and upload through a Dropbox file request link. The link will be shared through Slack.
- Best of Luck

Objectives

In this task, the objective is to study signals and source encoding.

PYTHON Task 1

Sync pulses $sinc(x) = \frac{sinx}{x}$ require minimum bandwidth for signal transmission. Plot sync pulse $m(t) = 2Bsinc(2\pi Bt)$, where $B = N + 5$ and N is the last digit of your BITS ID.

PYTHON Task 2

There is a base station in your locality which transmits signals at a power of 1Watt. The antenna gain of base station $G_T = 10$ dB while the antenna gain of the receiving antenna G_R is 0 dB. Use "for loop" to generate received power at various distance 100m to 5000m in the interval of 500 m for two frequencies 900 MHz and 2.4 GHz, and plot P_R in dBm versus distance. The formula for received power is given as:

$$P_R = \frac{P_T G_T G_R \lambda^2}{(4\pi d)^2} \tag{1}$$

PYTHON Task 3

Use "ord", "chr", and "bin" commands to generate binary equivalent of your full name.

Project Task

We have started individual tasks with a bigger picture: to design an end-to-end simulator for a digital communication system. In this task, we have generated information signals and implemented source encoding.