

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

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

31-08-2021 TUESDAY (P2, P4:): MATLAB

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 .m 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.

MATLAB Task 1

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

MATLAB Task 2

The frequency dependent channel gain of telephone channel is given as $H(f, d) = e^{-\gamma d}$, where d is the distance between Tx-Rx, γ is the propagation constant, and $\gamma = \sqrt{(R(f) + j\omega L(f))(G(f) + j\omega C(f))}$, where R , L , G , and C are line parameters dependent on frequency $\omega = 2\pi f$, as appended in the document. Take the 0.40 mm wire. Use “for loop” to generate channel gain $|H(f)|$ at various lengths 10m to 5000m in the interval of 500 m. Plot $|H(f)|$ in dB versus distance for frequencies 4KHz, 4MHz, and 4GHz.

MATLAB Task 3

Generate Huffman source coding dictionary of your full name using "huffmandict". Use huffmanenco and huffmandeco for encoding and decoding 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.