

Birla Institute of Technology & Science, Pilani, Rajasthan

First Semester 2020-2021 Lab-2: Information Signal

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

Date: 22-08-2020

Instructions

- Please do not take help from Internet or any other sources. It will more confuse you rather than serve the purpose of learning. If you have any iota of question, do not hesitate to ask. I guarantee that in few weeks you can code anything if you do as per instructions.
- Create a folder Lab2 in Lab sub-folder of your shared Dropbox folder.
- The whole task should be completed before 3:50PM, Tuesday. You are evaluated based on your approach/effort rather than CORRECTNESS !
- Your .m code name should be like this: recorded underscore voice, and similarly for the others. Always append, ver1, ver2, etc, if needed.
- You can start the tasks in any order.
- You need to submit .m file, and corresponding .jpg file for each task or even a part of the task. Use the file request link for your Lab section. Ask the TAs to share the link if you do not have. The link is available in the google meet invitation for respective lab sections.
- As I said earlier, please do not wait for all tasks to be completed. Once you get even a part completed, send it.
- You can also send the code with your queries/feedback. Name it like: recorded underscore voice underscore ver1, and write the question as a comment. Inform your TAs (or me) about the question using the DM slack. Using the feedback, improve the code and submit as recorded underscore voice underscore ver2 if you still have problem and so on. Finally, submit the code as recorded underscore voice.
- At 3:50 PM, compile all plots/results/observations/conclusions in a word doc and upload to the link. Do not paste any code in the word doc. You can also convert word to pdf and submit.
- Read the instructions once more !
- Best of Luck

Objectives

In this task, the objective is to study various types of information sources.

Task 1

I have explained the system block description of an analog communication system. Record in your voice (for around 60 seconds, single take only :) the concept of transmitter, channel, and receiver. Save the recorded voice in the folder Lab 2. Now, analyze the recorded voice using the MATLAB command 'audioread'. Verify the audio file using the MATLAB command 'sound'. Using the sampling frequency and duration of signal, verify the number of samples using Matlab command 'length'. Plot the time-domain and double sided frequency spectrum of the signal. Write your observation regarding the frequency content of speech signal.

Task 2

You listen various tones (dial, ringing, busy) using a telephone. These tones are generated with a combination of sine wave of various frequency. The tone plan is based on ITU-T Standard recommendation. The dial tone is a continuous tone of the addition of the frequencies 350 and 440 Hz. The ringing tone comprises frequencies of 440 and 480 Hz and a cadence of 2 seconds ON and 4 seconds OFF. The busy tone has frequency components of 480 and 620 Hz and a cadence of one half second ON and one half second OFF. Use this tone plan to generate different types (dial, ringing, and busy) tones. Use a speaker to listen various tones by applying Matlab function sound. While generating the sinewave, mind its amplitude (take 0.1 volt).

Task 3

In a .m file, write a short sentence about entropy (5 words only). Convert this information into binary digits (ASCII). Use dec2bin. Finally display all the binary digits in serial format. Use "reshape"

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.