ECE251: Signals and Systems Fundamentals

Fall 2023 Project

Student Activity (10 Marks)

Description:

The aim of this project is to develop a code that does the following:

- Read an audio file from the hard disk of the computer
- Plot the audio signal in time domain
- Find the frequency domain representation of the signal and plot it
- Apply a filter (either a LPF or HPF) to change the original frequency components of the audio signal, then plot the filtered signal in frequency domain
- Find the corresponding signal in time domain for the filtered signal and plot it
- Save the filtered signal in time domain as an audio file on the hard disk (of the same format as the original one)

Deliverables:

- A report showing the developed code and plots
- A brief oral discussion of the project, with a live test of the code on the student's computer

Notes:

- The input audio file should be one where each student of the group says his/her name (one audio file for all the group students)
- Students are free to choose the programming language (Python, MATLAB/Octave, C++ … etc.), and the filter applied on the audio signal in frequency domain (LPF/HPF)
- The project should be implemented in groups (not individuals) ideally of 5 students each
- Useful algorithms: Fast Fourier Transform and its inverse (fft/ifft)

Project deadline: 31st Dec 2023