

DSP Homework 3: Spectrogram of an Audio Signal

Write a code that generates spectrogram of a given 1D audio signal. Full specification of the homework is given as follows:

- User Input: Window Length (L)
- Function Output: Frequency-Time Plot (Spectrogram)

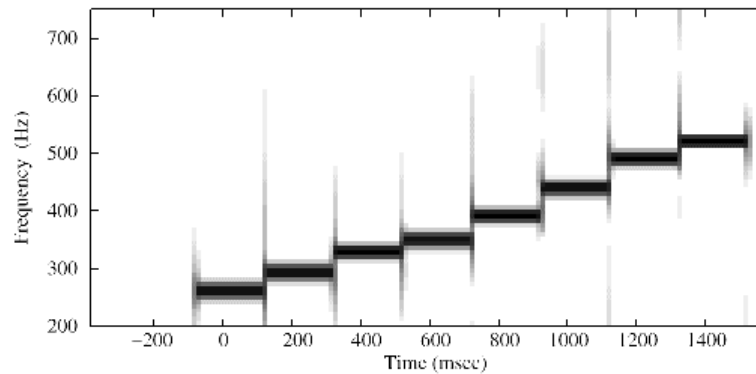


Figure 1. Spectrogram of an audio signal

Please apply the following steps:

- 1) Write a codes that compute spectrogram from scratch. Divide the signal into %50 overlapping time segments, and for each time segment apply the FFT with windowing. You can use “fft” built-in functions here (40 points),

Example:

```
F = spectrogram (A,L); % The function takes 1D signal, window length L and return its
                        % spectrogram
```

- 2) Apply it to the audio signals shared named “Audio 1” and “Audio 2”. Show the spectrograms in two different figures. In this step, select the window size as 500 (20 points).
- 3) Please comment the differences between these signals. Why did we use windowing process here? (20 points),
- 4) Change the window size to 50 and 200 and compare the spectrogram results of them. Please report how the window size affects the results. (20 points)

Deadline: 2 June 2022 until 00:00,

Please upload the following files to online.yildiz.edu.tr: Codes + Report (max. 4 page)