Term Project Presentation EEE 312 /EEE 3310 (A): Digital Signal Processing Laboratory project title: Noise Reduction of Audio Signal using Digital Filter

Presentation · February 2022

DOI: 10.13140/RG.2.2.31230.46403

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Term Project Presentation

Dept. Of Electrical & Electronic Engineering (EEE)

EEE 312 /EEE 3310 (A): Digital Signal Processing Laboratory

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Noise Reduction of Audio Signal using Digital Filter

INTRODUCTION

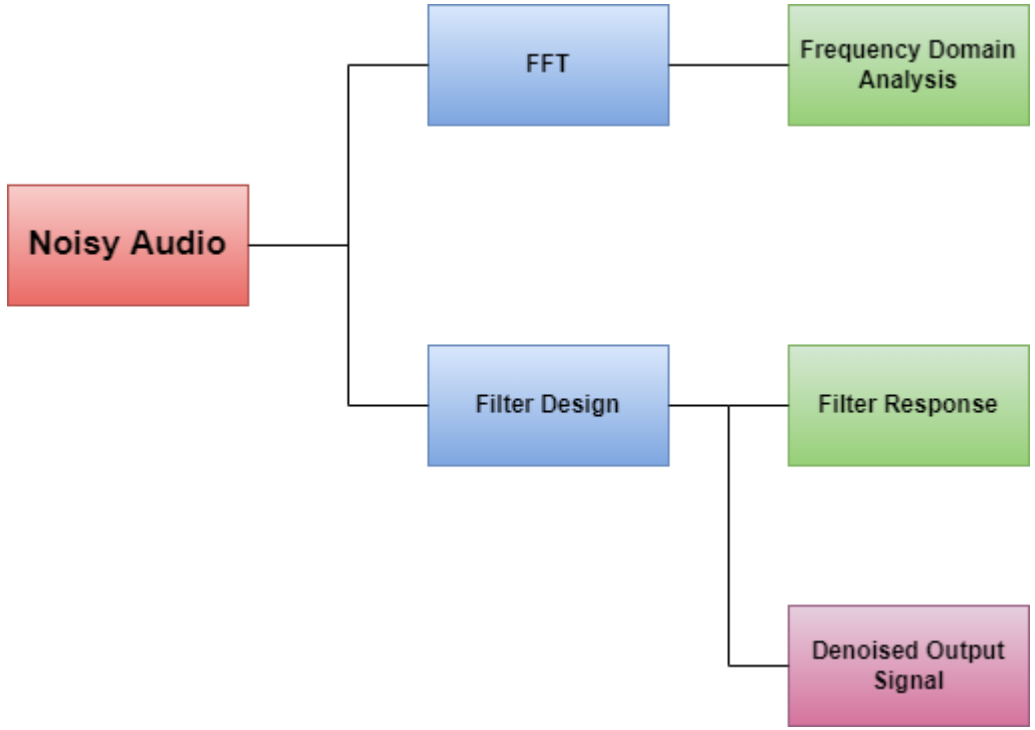
In the sector of real time audio communication, ‘noise’ is genuinely a big problem. If noise is present in a signal it will weaken the signal and it would be difficult to recognize auditory signals. For this, it is important to filter the signal in the frequency domain to get the signal without or less noise.

OBJECTIVE

The main objective of this project was to reduce noise from an audio signal. To do this, we had to learn various things like different types of filter, filter response etc.

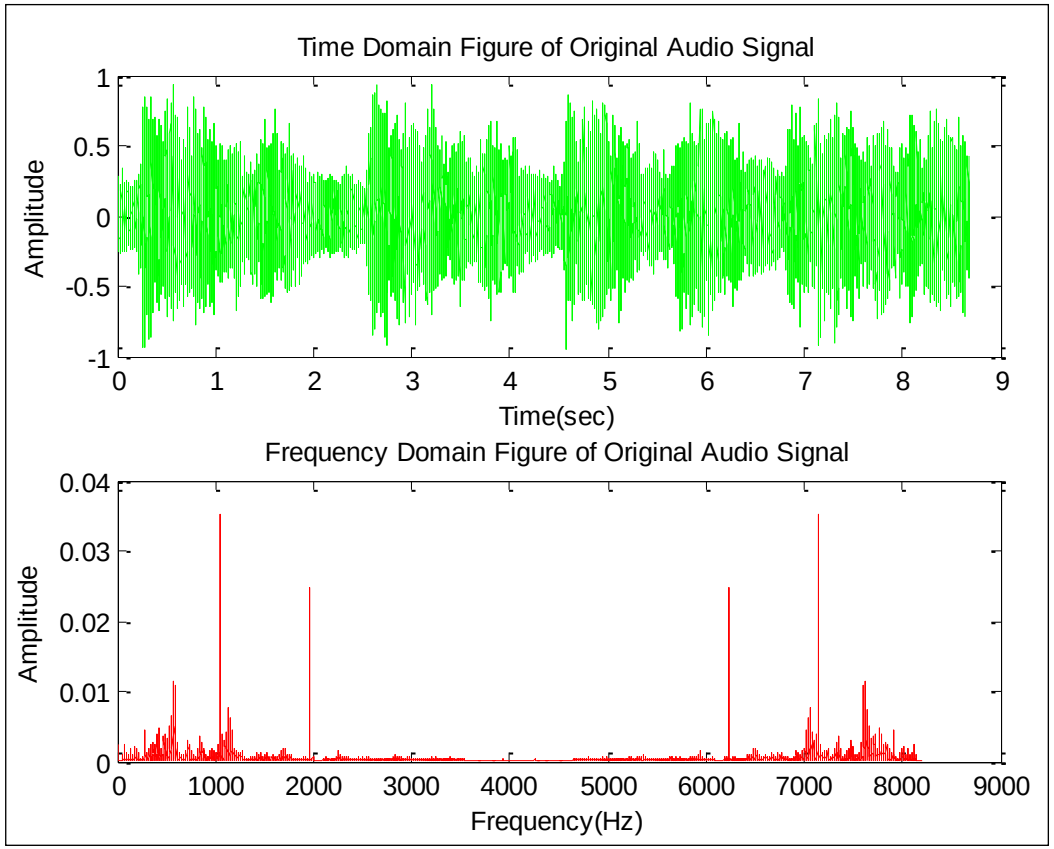
Methodology

First of all we needed a noisy signal. So we took it from the internet and then plotted it in time domain by using MATLAB. Then to analyze the signal in frequency domain we use FFT function and plotted it as an only one sided signal. Characteristics of filter such as the order of the system and the cutoff frequency are determined using the frequency domain representation of the signal. The processes of getting de noised signal from noisy signal is shown below-



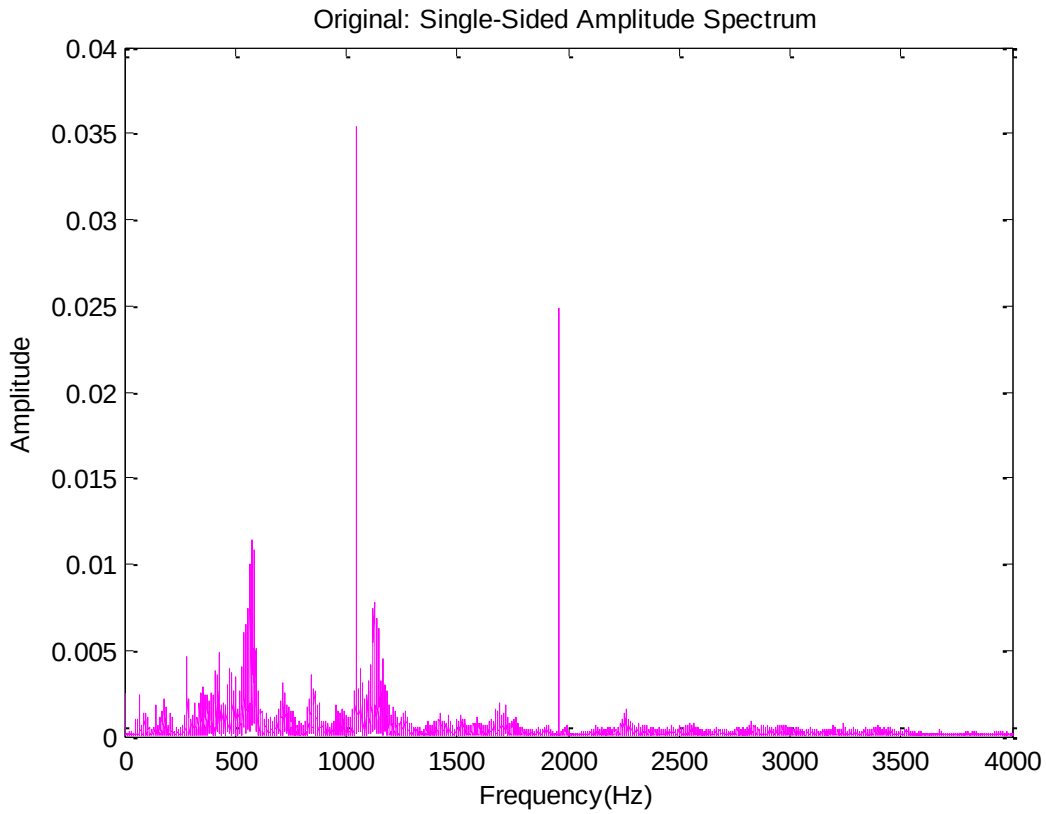
WORKING PROCESS

STEP I



First, we download a noisy signal and By using FFT we determine the frequency domain analysis of this signal and plotted it in both time and frequency domain.

STEP II



Second, single sided amplitude spectrum is plotted. And we found the noisy frequency at 1043 Hz and 1955 Hz.

WORKING PROCESS

STEP-III

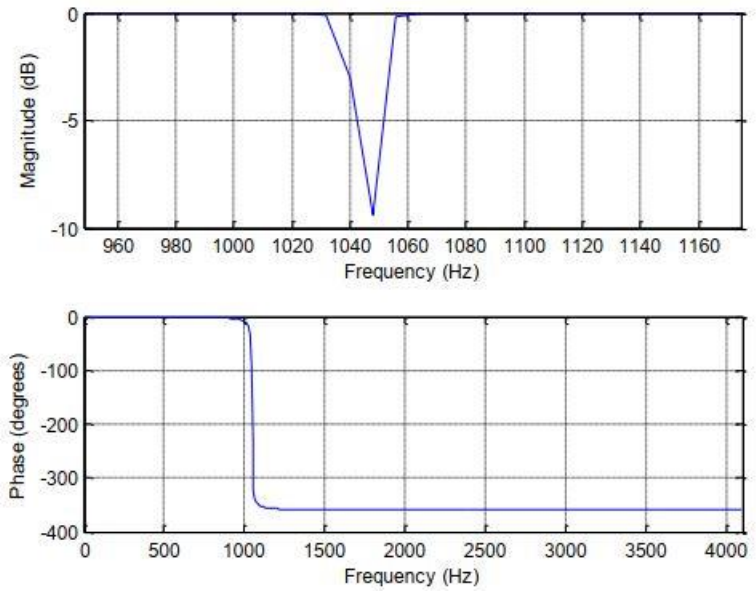


Figure -3: Frequency analysis of designed band reject filter.

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In this stage unwanted , we constructed a Band Stop filter to reject the noisy input at **1043** Hz and for that we choose the 2nd order Butter worth filter.

STEP- IV

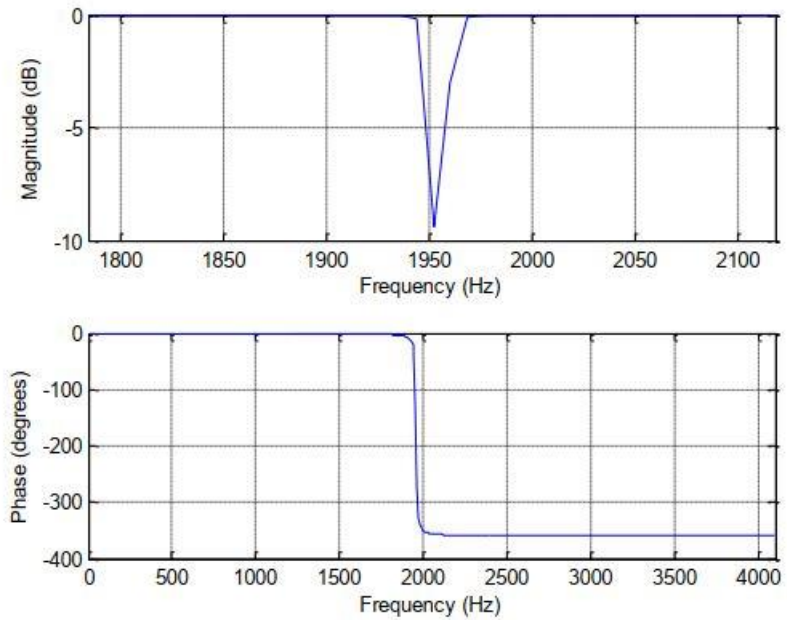

Figure -4: Frequency analysis of designed band reject filter.

In this stage unwanted , we constructed a Band Stop filter to reject the noisy input at **1955** Hz and for that we choose the 2nd order Butter worth filter.

OUTPUT RESULT

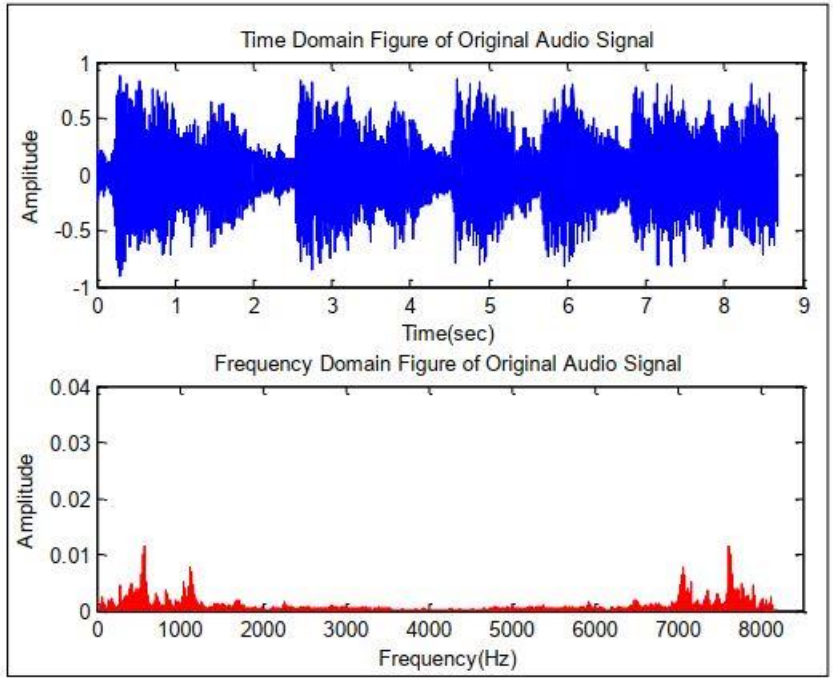

Figure -5: Both time domain and frequency domain analysis of output audio signal.

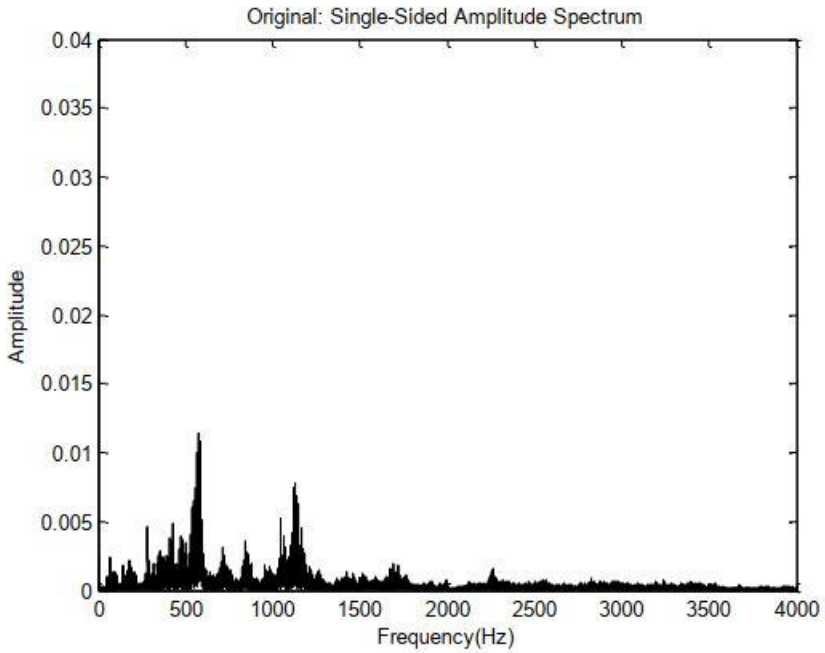

Figure -6: Single Sided frequency domain analysis of output audio signal.

After using second order Butterworth Band Reject Filter we get the final output. If we increase the order the attenuation is sharper. We plot the output signal bot time domain and frequency domain. Also, we plot the denoised the frequency domain signal's single-sided amplitude spectrum.

Thank You