SNS Coding Assignment - ReadME

Group 14

April 18, 2024

1 Introduction

This LaTeX document provides instructions for using the MATLAB script designed for signal filtering and analysis. The MATLAB script reads input and output signals from text files, designs low-pass, high-pass, and band-pass FIR filters, convolves them with the input signal, compares the filtered outputs with the output signal using correlation, and visualizes the results.

2 Usage

1. **Download MATLAB:** Ensure you have MATLAB installed on your system. If not, you can download it from the official MathWorks website.
2. **Clone the Repository:** Clone or download the repository containing the MATLAB script and input/output signal files.
3. **Open MATLAB:** Open MATLAB on your computer.
4. **Navigate to the Directory:** Use the `cd` command to navigate to the directory where you downloaded the MATLAB script and signal files.
5. **Run the Script:** Type the name of the MATLAB script in the command window and press Enter. For example:

   ```
   SnS_Coding_Assignment
   ```

6. **View the Results:** The script will display the input signal, output signal, and the filtered output signals in separate plots. It will also print the correlation coefficients and visualize the correlation graphs.

3 Input Signal Files

Ensure that you have the input signal file named `INPUT-SIGNAL-X(t).txt` and the output signal file named `OUTPUT-SIGNAL-Y(t).txt` in the same directory as the MATLAB script.

Note: Make sure that the input and output signal files are in the same directory as the MATLAB script.

4 Customization

- You can customize the filter specifications such as sampling frequency (`fs`), cutoff frequencies (`fc_lp`, `fc_hp`, `fc_bp1`, `fc_bp2`), and filter lengths (`N_lp`, `N_hp`, `N_bp`) according to your requirements.
- Additionally, you can modify the input and output signal filenames in the MATLAB script if necessary.

5 Dependencies

Warning: This MATLAB script relies on the Signal Processing Toolbox for designing FIR filters and performing signal processing operations.

Note: Make sure you have the Signal Processing Toolbox installed in MATLAB for the script to function properly.