

In the Name of God



Signals & Systems

Computer Assignment ٢



١. Open the file '*noisy.wav*' (we denote the signal as $x[n]$) and listen to it in MATLAB. Plot both phase and spectrum of the signal versus frequency in the interval $[-\pi, \pi]$.

As you can see, high frequency noise has been added to the original signal. After the following steps, you should be able to filter the noise.

٢. Consider an LTI system with the following system function:

$$H(z) = \frac{1 - z^{-\Lambda}}{1 - z^{-1}}$$

Plot the frequency response (including amplitude and phase), zero-pole diagram, and the impulse response of the system. What kind of filter is this system?

٣. Pass the noisy signal ($x[n]$) through a cascade of Λ above systems and name the outputs as $y_1[n]$, $y_2[n]$, ..., $y_\Lambda[n]$. Listen to these outputs one by one.

You should save all outputs in .wav format.

What are your observations? What should we do to hear the sound better?

After applying your proposed method, save the output in .wav format. You should save all outputs in .wav format.

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Hint:

You can use the following commands in MATLAB:

'fft, wavread, wavwrite, freqz, impz, xlabel, ylabel, title, figure, filter, tf2zpk, zplane, stem'