

Using Filter Technique Remove Noise from Random Signal

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Abstract: When the signals are transmitted through any media, there are different components that interact with the signals and alter them. These stray signals that interact with the transmitted signal are termed as Noise signals. These stray signals often lead to loss of the information hence their removal is important. This task of removing unwanted noise signal is done by signal processing techniques and removal of noise without the loss of information from the original signal has been a challenge for scholars and experts since long time. In this we remove noise from signal using filter in MATLAB.

Keywords: Noisy Signal, Filter

1. Introduction

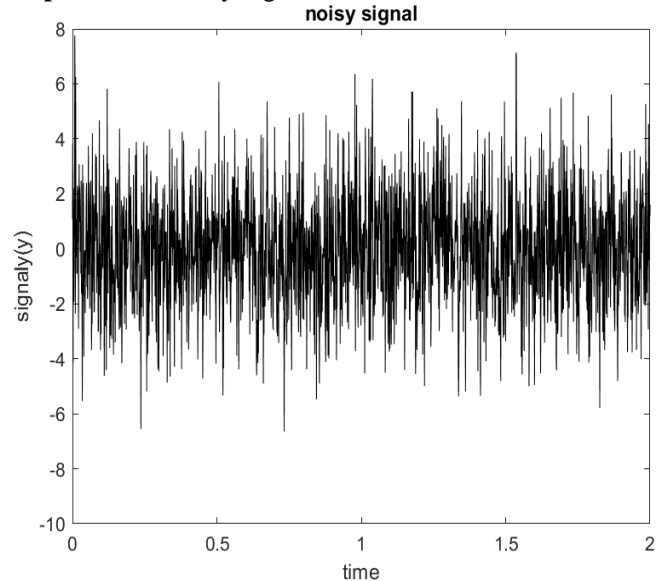
During the transmission of a signal, noise corrupts the signals and it poses a problem at the receiver end to remove noise and obtain the original signal. The removal of noise has always been a challenge and is still a significant issue in the field of Digital Signal Processing and so it is still the cause of concern for researchers. Since long the FIR and IIR systems are being improvised. There are various algorithms for filter designing. Due to few overheads and low cost of hardware, the FIR filter has taken precedence over IIR filters in past few epochs. FIR filters find application in pre-processing of signals for various communication purposes. They are also employed in video convolution functions. Various techniques like windowing, sampling of frequency has been utilized for this purpose. A large number of window based techniques that have been proposed in the past are based on various metrics like pass band ripple, filter order, length of filter and so on. The most commonly used window function is a rectangular window function. In this function, the truncation of the signal takes place due to the multiplication of the impulse response with a function of unit amplitude. The coefficients that are outside the window are ignored. There is an occurrence of ripple and overshoots in frequency response due to side lobes, which are present due to random truncation. For removal of ripples and overshoots, only those window functions are considered that do not have abrupt transitions in their time and frequency domain characteristics. For addressing the limitations of rectangular window, several other windows that do not have abrupt discontinuities in their frequency and time domain, were employed for implementing digital FIR filters. These include Hanning, Hamming, Chebyshev and Blackmann Window.

Filter:

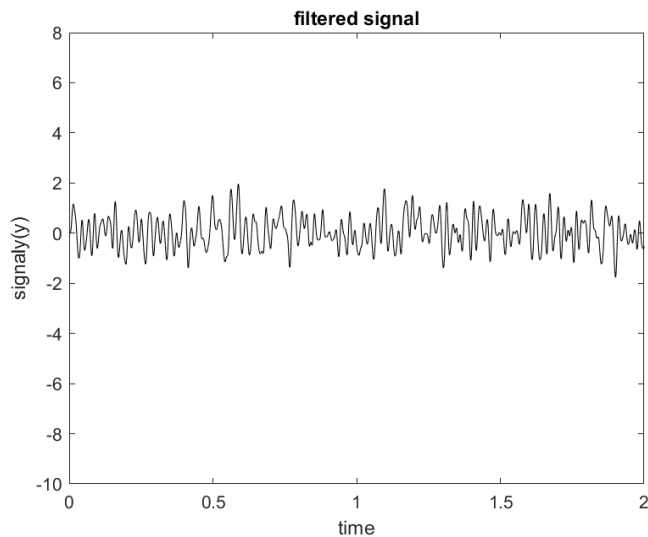
A filter is a mathematical function that is utilized for removing noise components from signals. This filter can also be made as hardware. Filters are used to remove several specific frequency components, so that there is no loss of

information in the signal under consideration. Filters find application in signal processing, image processing, different communication systems etc. Linear continuous filter having linear response is a type of filter that is selectively allow several frequency components to pass and stop the rest of the frequency components.

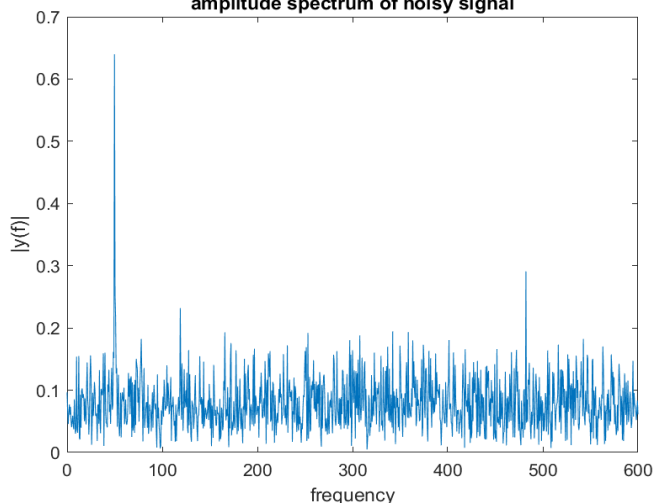
Step: 1 Create Noisy Signal In the MATLAB



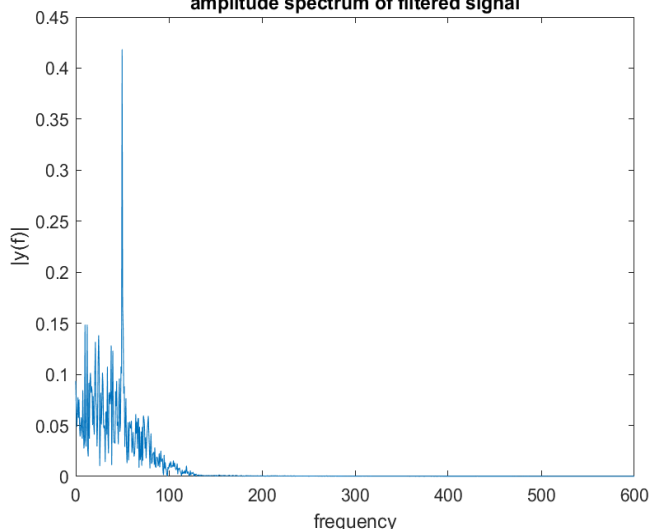
Step: 2 Apply the Filter on Noisy Signal



Step: 3 Check the Amplitude Spectrum of Noisy Signal
amplitude spectrum of noisy signal



Step: 4 Check the Amplitude Spectrum of Filter Signal
amplitude spectrum of filtered signal



2. Conclusion

Filters find application in signal processing, image processing, different communication systems etc. Among a noteworthy number of strategies proposed for evacuation of noise from signals, utilize of computerized channels has gotten to be most strong in numerous ways. Less significant

overheads in scheming and lower hardware rate have through the Finite Impulse Response (FIR) filters popular.

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