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Additive White Gaussian Noise Filtering from ECG by Wiener Filter and Median Filter: A Comparative Study

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Abstract : The Electrocardiogram (ECG) is the recording of the heart's electrical potential versus time. ECG signals are often contaminated with noise such as baseline wander and muscle noise. As these signals have been widely used in clinical studies to detect heart diseases, it is essential to filter these noises. In this paper we compare performance of Wiener Filtering and Median Filtering methods to filter Additive White Gaussian (AWG) noise with the determined signal to noise ratio (SNR) ranging from 3 to 5 dB applied to long-term ECG recordings samples. Root mean square error (RMSE) and coefficient of determination (R2) between the filtered ECG and original ECG was used as the filter performance indicator. Experimental results show that Wiener filter has better noise filtering performance than Median filter.

Keywords : ECG noise filtering, Wiener filtering, median filtering, Gaussian noise, filtering performance
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