

A PERFORMANCE ANALYSIS ON NOISE SUPPRESSION IN MEDICAL SIGNAL USING DIFFERENT ADAPTIVE FILTER ALGORITHMS

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Abstract

Electrocardiography deals with the electrical activity of the heart. Monitored by placing sensors at defined positions on chest and limb extremities of the subject, electrocardiogram (ECG) is a record of the origin and propagation of the electric action potential through cardiac muscle. Removal of noises from ECG signal is a classical problem. In recent years, adaptive filtering has become one of the effective and popular approaches for the processing and analysis of the ECG and other biomedical signals. Adaptive filters have been used in a wide range of signal processing application because of its simplicity in computation and implementation; it permits to detect time varying potentials and to track the dynamic variations of the signals. Besides, they modify their behavior according to the input signal. Therefore, they can detect shape variations in the ensemble and thus they can obtain a better signal estimation. This paper focuses on, get a Model ECG signal, then synthetic noises have been corrupted with ECG signal and nullify these noises using various adaptive filter algorithms, to remove 50Hz Power line interference and baseline wondering from ECG signals using LMS, NLMS and SRLMS adaptive filter algorithms. At the end of this paper, a performance study has been done between these algorithms based on changing various step sizes and various filter. It has been found that there will be always tradeoff between step sizes and Mean square error and Signal to noise Ratio.

Keywords : FIR Filters, Adaptive Filters, LMS algorithm, NLMS Algorithm, SRLMS Algorithm, ECG signals, Noise cancellation.

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