

## A Pole Radius Varying Notch Filter with Transient Suppression for Electrocardiogram

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**Abstract :** Noise removal techniques play a vital role in the performance of electrocardiographic (ECG) signal processing systems. ECG signals can be corrupted by various kinds of noise such as baseline wander noise, electromyographic interference, and power-line interference. One of the significant challenges in ECG signal processing is the degradation caused by additive 50 or 60 Hz power-line interference. This work investigates the removal of power line interference and suppression of transient response for filtering noise corrupted ECG signals. We demonstrate the effectiveness of Infinite Impulse Response (IIR) notch filter with time varying pole radius for improving the transient behavior. The temporary change in the pole radius of the filter diminishes the transient behavior. Simulation results show that the proposed IIR filter with time varying pole radius outperforms traditional IIR notch filters in terms of mean square error and transient suppression.

**Keywords :** notch filter, ECG, transient, pole radius

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