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Abstract

HILBERT-HUANG TRANSFORM AND ITS APPLICATION
IN BIOMEDICAL SIGNALS

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Time-frequency analysis technology has been used to analyze how the frequency content of a signal is changing in time. The typical time-frequency analysis methods, such as a short time Fourier transform, Wavelet transform, Wigner-Ville distribution and its improvement methods has been applied in several signal processing fields, such as speech and biomedical signal. However, these methods are based on the Fourier analysis by introducing localized function to deal with the dilemma of global integral transform. More these methods suffer from the restrict requirements of linear and stationary process. Unfortunately, nonlinear and nonstationary signals are general in the real world. For this reason, a method, Hilbert-Huang Transform (HHT), which is applicable to nonlinear and nonstationary processes, is proposed. This method mainly consists of two parts: empirical mode decomposition (EMD) and Hilbert spectrum analysis (HSA). The key part is EMD which can separate the data into several intrinsic mode functions (IMFs). As a result, this thesis tries to analyze the characteristic of HHT by compared with the traditional time-frequency methods. Moreover, it tries to use it for baseline correction in ECG signal and spindles analysis in EEG signal.

Key wards: Time-frequency analysis, Hilbert-Huang Transform, Empirical Mode Function, Intrinsic Mode Function, Baseline, Spindle Detection