

Empirical Mode Decomposition Method And Hilbert Spectral Analysis Algorithms

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DESCRIPTION

This technology is a computer implemented physical signal analysis method. This method includes two essential steps and the associated presentation techniques of the results. All the steps exist only in a computer: there are no analytic expressions resulting from the method. The first step is a computer implemented Empirical Mode Decomposition to extract a collection of Intrinsic Mode Functions (IMF) from nonlinear, nonstationary physical signals. The decomposition is based on the direct extraction of the energy associated with various intrinsic time scales in the physical signal. Expressed in the IMF's, they have well-behaved Hilbert Transforms from which instantaneous frequencies can be calculated. The second step is the Hilbert Transform. The final result is the Hilbert Spectrum. Thus, the invention can localize any event on the time as well as the frequency axis. The decomposition can also be viewed as an expansion of the data in terms of the IMF's. Then, these IMF's, based on and derived from the data, can serve as the basis of that expansion. The local energy and the instantaneous frequency derived from the IMF's through the Hilbert transform give a full energy-frequency-time distribution of the data which is designated as the Hilbert Spectrum.

FEATURES AND BENEFITS

- Contrary to almost all the previous methods, this new computer implemented method is intuitive, direct, a posteriori, and adaptive, with the basis of the decomposition based on and derived from the physical signal.

APPLICATIONS

- Geometrical Signal Processing
- Biological Signal Processing
- Geophysical Signal Processing

FOR MORE INFORMATION

If you are interested in more information or want to pursue transfer of this technology, GSC-13817-1, please contact:

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