The model and construction of weak IMFs.

Summary: The empirical mode decomposition is a powerful tool for analyzing nonstationary signals. It decomposes a signal into a few Intrinsic Mode Functions (IMFs) adaptively. As an empirical model for the so-called mono-component or narrow-band signals, the IMF lacks rigorous mathematical definition. It is an open theoretic problem to establish a rigorous mathematical model for IMFs. In this paper, we model the IMF as the form \( \rho(t) \cos \theta(t) \) and study the conditions on \( \rho(t) \) and \( \theta(t) \) such that \( \rho(t) \cos \theta(t) \) is a weak IMF. Some useful sufficient conditions are presented.

Keywords: intrinsic mode function (IMF); empirical mode decomposition; envelope; mono-component signal

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