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Estimation of frequency modulations on wideband signals; applications to audio signal analysis

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(Submitted on 14 May 2013)

The problem of joint estimation of power spectrum and modulation from realizations of frequency modulated stationary wideband signals is considered. The study is motivated by some specific signal classes from which departures to stationarity can carry relevant information and has to be estimated. The estimation procedure is based upon explicit modeling of the signal as a wideband stationary Gaussian signal, transformed by time-dependent, smooth frequency modulation. Under such assumptions, an approximate expression for the second order statistics of the transformed signal's Gabor transform is obtained, which leads to an approximate maximum likelihood estimation procedure. The proposed approach is validated on numerical simulations.

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