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Optimised Local Renyi Entropy-Based Shrinkage Algorithm for Sparse TFD Reconstruction

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Time-frequency distributions (TFDs) are useful tools for nonstationary signals analysis. Due to the presence of unwanted cross-terms, useful information extraction from TFDs has proven to be a challenging task, in particular when analysing noisy real-life signals.
One way to suppress the cross-terms is by employing compressive sensing methods that enforce sparsity in the resulting TFD. In this work, we have developed a sparse algorithm that reconstructs a TFD from a small sub-set of signal samples in the ambiguity domain. The algorithm utilises the information from both the short-term and the narrow-band Renyi time-frequency entropies, while its parameters are optimised using evolutionary meta-heuristic methods.
Results are presented for synthetic and real-life signals in noise, and compared to the state-of-the-art sparse reconstruction algorithms.

Promotional text

We have proposed a novel algorithm for sparse representation of nonstationary signals. The algorithm utilises Renyi time-frequency entropy information, and it's optimised using evolutionary methods.

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