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Research Letter

An Adaptive Resolution Computationally Efficient Short-Time Fourier Transform

Saeed Mian Qaisar, Laurent Fesquet, and Marc Renaudin

TIMA, CNRS UMR 5159, 46 avenue Felix-Viallet, 38031 Grenoble Cedex, France

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Abstract
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Abstract

The short-time Fourier transform (STFT) is a classical tool, used for characterizing the time varying signals. The limitation of the STFT is its fixed time-frequency resolution. Thus, an enhanced version of the STFT, which is based on the cross-level sampling, is devised. It can adapt the sampling frequency and the window function length by following the input signal local characteristics. Therefore, it provides an adaptive resolution time frequency representation of the input signal. The computational complexity of the proposed STFT is deduced and compared to the classical one. The results show a significant gain of the computational efficiency and hence of the processing power.