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Damped sinusoids and subspace based approach for lossy audio coding

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The new subspace-based techniques recently introduced appear to be well adapted for the parameters estimation of a damped sinusoids + noise signal model. These High-Resolution (HR) methods have a better frequency resolution than the Fourier analysis, but they are rarely used in audio coding. Although HR methods would be suitable for parametric coding at low bitrates, we show that they are also efficient for high-bitrate coding where state-of the art codecs are usually transform-based. Our coding scheme first includes a 8-band PQMF filter-bank decomposition. Then, each subband signal is segmented in onsets and a maximum-order HR analysis is performed on each segment with the ESPRIT algorithm. For each component of the model, frequency, damping, amplitude and phase are quantized. The residual signal is not coded. This codec is compared to a MDCT framework, where transform and quantization are the same as in a MPEG-AAC but without inclusion of perceptual modelling and entropy coding. Preliminary objective and subjective tests show the potential of this approach which requires, on mostly tonal signals, significantly less bits than the traditionnal MDCT method for a given quality.