

## DFT-Filterbanks with Spectral Refinement and its Comparison with Polyphase Filterbanks

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### Abstract

The most popular uniform analysis scheme applied for speech enhancement periodically performs DFTs of overlapping and windowed signal segments. However, due to the windowing of successive signal segments, often a significant frequency overlap arises among neighboring subbands. These overlapping effects are undesirable as they limit the performance of adaptive filters and the feature estimation in the subband domain. In order to reduce this overlap without increasing the DFT order, the so-called spectral refinement (SR) can be utilized. The SR is based on a linear combination of weighted and shifted speech segments and can be applied as a post-processing stage after a DFT-based analysis filterbank. In this contribution the SR is used as a predecessor to a DFT. It can be shown that the resulting SR structure in the time-domain for DFT-based analysis filterbanks looks similar to polyphase filterbanks. For enhanced frequency selectivity of the analysis, preceding weighted blocks need to be added before performing the DFT. A window function of higher order has to be defined that covers the current as well as previous input segments. In case of SR, a set of shifted low-order window functions are linearly combined and transformed into a desired window function of higher order.

Keywords: polyphase filterbanks, spectrum computation, fundamental frequency estimation, speech enhancement, DFT, spectral refinement