

Improvement of LMS adaptive noise canceller using uniform poly-phase digital filter bank

ABSTRACT

This paper presents the Least Mean Square (LMS) noise canceller using uniform poly-phase digital filter bank to improve the noise cancellation process. Analysis filter bank is used to decompose the full-band distorted input signal into sub-band signals. Decomposition the full-band input distorted signal into sub-band signals based on the fact that the signal to noise ratio (S/N) is inversely proportional to the signal bandwidth. Each sub-band signal is fed to individual LMS algorithm to produce the optimal sub-band output. Synthesis filter bank is used to compose the optimal sub-band outputs to produce the final optimal full-band output. In this paper, m-band uniform Discrete Fourier Transform (DFT) digital filter bank has been used because its computational complexity is much smaller than the direct implementation of digital filter bank. The simulation results show that the proposed method provides the efficient performance with less and smooth error signal as compared to conventional LMS noise canceller.

Keyword: Least mean square (LMS) algorithm; Noise canceller; Poly-phase digital filter bank discrete fourier transform (DFT); Decomposition technique