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A Novel Multiuser Detector with Enhanced Robustness Against Carrier Frequency Offset

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Abstract

In this paper, a closed-form expression for the output signal-to-interference-plus-noise ratio (SINR) is first derived to evaluate the carrier frequency offset (CFO) effect on the performance of the minimum output energy (MOE) detector. As a remedy, we propose a new method performing on the effective time-domain data, in which the CFO estimate obtained by maximizing the output power of the MOE detector is incorporated. By imposing the subspace technique, the proposed detector can further reduce the sensitivity to the problems of CFO and of the finite sample effect (sample covariance errors). Theoretical analysis on the output SINR is presented to confirm its efficacy. Numerical results demonstrate that the proposed detector substantially outperforms conventional detectors.

Key words：Multicarrier code-division multiple access (MCCDMA); Carrier frequency offset (CFO); Minimum output; Energy (MOE); Subspace MOE (SMOE)