

Joint Low-Complexity Equalization and Carrier Frequency Offsets Compensation Scheme for MIMO SC-FDMA Systems

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Abstract

Due to their noise amplification, conventional Zero-Forcing (ZF) equalizers are not suited for interference-limited environments such as the Single-Carrier Frequency Division Multiple Access (SC-FDMA) in the presence of Carrier-Frequency Offsets (CFOs). Moreover, they suffer increasing complexity with the number of subcarriers and in particular with Multiple-Input Multiple-Output (MIMO) systems. In this letter, we propose a Joint Low-Complexity Regularized ZF (JLRZF) equalizer for MIMO SC-FDMA systems to cope with these problems. The main objective of this equalizer is to avoid the direct matrix inversion by performing it in two steps to reduce the complexity. We add a regularization term in the second step to avoid the noise amplification. From the obtained simulation results, the proposed scheme is able to enhance the system performance with lower complexity and sufficient robustness to estimation errors.

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