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(57) Abstract :

In this study, we are concerned with a near-optimal detection algorithm namely Lattice Reduction associated Reactive Tabu Search (LR-RTS) detection for large Multi-user Multiple Input Multiple Output (MU-MIMO) systems with hundred or/and thousands of antennas at the enhanced Mobile Broadband station (e-MBBS) and Mobile Users (MU). The performance of the MU-MIMO system is severely affected by the interferences such as Inter-Antenna Interference (IAI) and Multi-user Interference (MUI). The main contribution of this work is two-fold. First, the Lattice Reduction (LR) based precoding scheme is incorporated at MU for suppressing the IAI. Then secondly, an LR-associated RTS detection algorithm is proposed, in which the initial solution is approximated by the proposed LR pre-coder that mitigates the MUI at e-MBBS. The proposed scheme outperforms the linear detection technique named Zero Forcing (ZF) as well as the heuristic search-based algorithm such as Likelihood Ascent Search (LAS). For a large number of antennas and higher-order QAM, the proposed LR-RTS detection algorithm based on the layered local neighbourhood search provides a better trade-off between the performance and computational complexity. Simulation results show that the proposed LR-RTS technique has approximately 2dB to 9dB gain over the classical techniques.

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