Greedy Power Allocation Algorithm for Proportional Resource Allocation in Multi-User OFDM Systems

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Abstract

Multi-User Orthogonal Frequency Division Multiplexing (MU-OFDM) is an efficient technique for achieving high downlink capacity in high-speed communication systems. A key issue in MU-OFDM is the allocation of the OFDM subcarriers and power to users sharing the channel. In this paper, a proportional rate-adaptive resource allocation algorithm for MU-OFDM is presented. Subcarrier and power allocation are carried out sequentially to reduce the complexity. The low complexity proportional subcarriers allocation is followed by Greedy Power Allocation (GPA) to solve the rate-adaptive resource allocation problem with proportional rate constraints for MU-OFDM systems. It improves on the work of Wong et al. in this area by introducing optimal GPA that achieves approximate rate proportionality, while maximizing the total sum-rate capacity of MU-OFDM. It is shown through simulation that the proposed GPA algorithm performs better than the algorithm of Wong et al. by achieving higher total capacities with the same computational complexity, especially, at higher number of users.

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