Achievable Throughput under BER Constraints via Transmission Scheduling and Multiuser Detection

Abstract:

We evaluate the throughput that can be achieved under BER constraints by combined use of transmission scheduling and multiuser detection. A schedule is a rule that specifies which subset of users is allowed to simultaneously transmit in a time slot. These subsets of overlapping transmissions, which can vary in different time slots of the transmission frame, are decoded by receivers equipped with multiuser detection. The goal is to find the largest such subsets under the requirement that each transmission satisfies a BER constraint. The joint problem of scheduling and multiuser-detection is highly complex in general. However, for certain class of multiuser detectors, the problem has efficient and optimal solution. By constructing transmission schedules that directly reflect the performance and exploit the capability of the multiuser detection receivers, as expected, multiuser detection-based scheduling significantly outperforms other methods such as TDMA and the conventional single-user detection-based scheduling.