Antenna Array-aided Resource Allocation Algorithms for OFDMA-based Networks

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ABSTRACT

In this paper, we propose antenna array-aided resource (subcarriers and bits) allocation solutions for OFDMA-based cellular networks. The first scheme is based on transmit spatial diversity, in which the best channel between the specific transmit antenna and mobile receiver is chosen for transmission. The second scheme assigns subcarrier to the user with highest vector channel gain, then employs transmit beamforming to further enhance the received signal energy. Space-division multiple-access (SDMA) technique is utilized in the third and fourth schemes to achieve throughput multiplication. The SDMA scheme assigns "nearly orthogonal" users to the same subcarrier, while in the fourth scheme, we propose to design prefilters to meet the zero-forcing (ZF) criterion such that the multi-user interference (MUI) is completely removed. The proposed algorithms are adaptive to maximize system throughput subject to the constraints that each user has a minimum data rate requirement. Moreover, adaptive modulation is employed according to the channel state information (CSI) of each user to meet the symbol error rate (SER) requirement. Numerical results show that the proposed algorithms comprehensively increase throughput, yet it enjoys the features of simplicity.

Keywords: Space-division multiple-access, Orthogonal frequency-division multiple-access, Multiple input-s...