

论文与技术报告

空间相关信道下的交替多用户调度算法

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摘要:

针对多用户多输入多输出(MIMO)系统,研究了空间相关信道下的多用户调度问题。通过推导用户信道向量夹角的统计特征,分析了多用户调度算法对所调度用户间正交性的影响。分析结果表明在空间相关信道下现有基于串行搜索的调度方法在统计意义上降低了被调度用户之间的正交性,从而导致基于串行搜索的调度算法与最优的穷举搜索之间存在较大的性能差距。为了提高相关信道下多用户MIMO系统的性能,提出了一种基于交替搜索的多用户调度算法及其低复杂度实现方法。仿真结果表明,所提出的用户调度算法能够有效地弥补基于串行搜索的调度方法的性能损失,在空间独立信道和空间相关信道下以较低的计算复杂度获得接近穷举搜索的最优性能。

关键词: 多用户MIMO系统 用户调度 空间相关信道 交替搜索

Alternating Multiuser Scheduling in Spatially Correlated Channels

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Abstract:

Multiuser scheduling for spatially correlated channels is investigated in multiuser multiple-input multiple-output (MIMO) systems. The impact of user scheduling algorithms on the orthogonality between the scheduled users is analyzed by characterizing the statistics of the angle between users' channel vectors. It is shown that existing successive searching based schedulers reduce the orthogonality between scheduled users in a statistic sense in spatially correlated channels, which leads to a large performance gap between successive searching based schedulers and the optimal exhaustive searching scheduler. In order to improve the performance of multiuser MIMO systems in spatially correlated channels, an alternating searching based user scheduling method is then proposed and its low-complexity implementation is studied. Simulation results show that the proposed user scheduler effectively recovers the performance loss caused by successive searching based schedulers, which performs close to the optimal exhaustive searching but with much lower computational complexity in both spatially independent and correlated channels.

Keywords: Multiuser MIMO systems user scheduling spatially correlated channel alternating searching

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