

论文与技术报告

多点协作下行链路单调协同波束形成算法

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摘要:

研究了单基站功率约束条件下的多点协作多输入单输出干扰下行链路系统的和速率最大化非凸优化问题。为有效求解和速率最大化优化问题, 首先采用分层优化方法将和速率最大化优化问题分解成发射功率最小化优化问题和单输入单输出干扰信道的和速率最大化优化问题; 其次利用二阶锥规划优化方法求解发射功率最小化优化问题; 然后利用凸近似和几何规划方法求解单输入单输出干扰信道的和速率最大化优化问题; 最后通过交替求解这两个子优化问题, 进而提出了一种新颖的单调协同多点波束成形算法; 而且利用单有界序列原理证明了所提算法的收敛性。数值仿真表明所提算法只需约四次迭代即可收敛到稳定点, 而且所获得的最优性能非常接近穷举搜索算法的最优性能。

关键词: 多点协作 最大化和速率 交替优化 二阶锥规划 几何规划

Multiple Point Cooperation Downlink Monotonic Coordinated Beamforming Algorithm

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Abstract:

The sum rate maximization non-convex optimization problem was studied for coordinated multiple point multiple input single output (MISO) interference downlink system subject to per-base station power constraints. In order to solve efficiently the sum rate maximization optimization problem, the primal sum rate maximization optimization problem was firstly decomposed into the transmission power minimization optimization problem and the sum rate maximization optimization problem of single input single output interference channel by using the hierarchical optimization method. Then, the transmission power minimization optimization problem was solved by using the second order conic programming method. The sum rate maximization optimization problem was solved by using convex approximation method and geometric programming method. Finally, a novel monotonic coordinated multiple point beamforming algorithm was proposed by solving alternately the above two sub-problems. The convergence of the proposed algorithm was proven by using the monotonic boundary sequence theorem. The numerical simulation shows that the proposed algorithm converges to stable point with about four iterations and the achieved optimal performance is very close to the optimal performance of the exhaustive search algorithm.

Keywords: Coordinated multiple point, Maximization sum rate, Alternated optimization, Second order conic programming, Geometric programming

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