

短文与研究通讯

一种分布式的OFDMA系统资源分配算法

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摘要:

本文研究OFDMA系统的资源分配问题, 把该问题建模为一个在基站的总发射功率一定的条件下, 使系统中各个用户的权重速率之和最大化的数学模型. 并提出一种基于对偶分解的分布式资源分配算法, 将该问题分解为一个关于基站的主问题以及若干个关于用户的子问题. 各个用户可以通过对子问题的求解获得各自的子载波以及功率的分配方案; 而基站通过对主问题的求解使得满足子载波与功率的分配能够满足约束条件的要求, 实现各用户权重速率和最大化的优化目标. 所提算法能够把一个复杂的优化问题分解为若干个独立的子问题进行并行求解, 因此可以有效地降低计算的复杂度以及基站的运算量. 仿真结果表明, 该算法能够在较少的迭代步数内得到一个近似最优解.

关键词: 正交频分多址接入; 资源分配; 对偶

A Distributed Resource Allocation Algorithm for OFDMA Systems

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Abstract:

This paper studies the problem of resource allocation for OFDMA systems. The problem is formulated as a weighted sum rate maximization problem subject to total transmission power constraints. A distributed resource allocation algorithm based on dual decomposition is proposed. The problem is decoupled into a master problem with regard to the base station and several subproblems with regard to the users. Each user can obtain its own subcarriers and power allocation scheme by solving the subproblem. The base station can make sure all the constraints are met and the weighted sum rate of each user is maximized by solving the master problem. Through decomposition, a complicated optimal problem is seperated into several independent subproblems that can be solved parallelly, so both the computational complexity and the caculation payload of the base station are effectively reduced. Simulation results show that the proposed algorithm can converge quickly to an approximated optimal solution in a small number of iterations.

Keywords: orthogonal frequency division multiple access resource allocation; dual

收稿日期 2010-04-06 修回日期 2010-06-26 网络版发布日期 2010-11-25

DOI:

基金项目:

中央高校基本科研业务费专项资金资助(2009ZM0071); 粤港关键领域重点突破项目(20060104-2)

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