

## 比例速率约束下OFDMA系统近似最优的资源分配算法

陈瑾平 李春国 杨绿溪\*

东南大学信息科学与工程学院 南京 210096

## Near-optimal Resource Allocation Algorithms for OFDMA Systems with Proportional Rate Constraints

Chen Jin-ping Li Chun-guo Yang Lu-xi\*

School of Information Science and Engineering, Southeast University, Nanjing 210096, China

摘要

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**摘要** 中继协作OFDMA系统以及非中继OFDMA系统, 在比例速率公平性约束下的无线资源分配问题, 是含非线性等式约束的混合离散型优化问题, 很难得到满足实时性要求的近似最优算法。该文分别基于这两种系统在速率公平性约束下的等价优化模型, 提出拉格朗日松弛的联合优化算法。算法的关键在于OFDMA系统的渐进强对偶性, 这个性质使得多项式时间算法的设计成为可能。该文算法的复杂度与系统载波数目成线性关系; 仿真结果表明, 算法的性能极好地逼近最优分配方案性能。

**关键词:** OFDMA系统 比例公平 中继 资源分配 近似最优

**Abstract:** The joint resource allocation issue in OFDMA systems or relay-based OFDMA systems with proportional fairness constraints is a mixed discrete programming issue including nonlinear equality constraints, which is hard to tackle efficiently and near optimally. In this paper, an algorithms to solve these two non-convex problems are proposed by Lagrangian dual relaxation based on the equivalent forms. The key in the algorithms is the so-called asymptotic strong duality for OFDMA systems. The asymptotic strong duality suggests that it may be possible to devise polynomial time approximation schemes. These algorithms have the computational complexity linear with the number of subcarriers. Numerical results show that the proposed algorithms can be near optimal to the globally optimal solutions.

**Keywords:** OFDMA systems Proportional fairness Relay Resource allocation Near-optimal

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**通讯作者:** 杨绿溪 Email: lxyang@seu.edu.cn

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