电子与信息学报 2010 32 (4): 775-780 ISSN: 1009-5896 CN: 11-4494/TN

论文

OFDMA上行链路中基于博弈论的子载波和功率分配算法

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收稿日期 2008-4-7 修回日期 2010-1-22 网络版发布日期 2010-4-7 接受日期

摘要
传统OFDMA上行链路资源分配算法中一般以最大化各用户速率或最小化发射功率为依据对子载波和功率进行分配，而对于各用户的功率效率问题并没有加以考虑。针对这一问题，该文提出了一种基于功率效率最优的联合子载波功率分配算法。首先给出了在各用户峰值功率约束条件下达到收益函数最优的必要条件并证明了算法纳什均衡的存在及唯一性，然后给出了子载波功率分配算法。仿真表明：相比最大边界速率子载波和功率分配算法(MaxRt+WF)和固定子载波和功率分配算法(MaxFA+WF)，该文算法能大幅度提高各用户的功率效率。同时如果合理地选择代价参数，算法获得的和功率效率能够达到更大。

关键词 OFDMA 功率效率 资源分配 博弈论

分类号 TN92

Subcarrier and Power Allocation Based on Game Theory in Uplink OFDMA Systems

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Abstract
The main objective of the traditional OFDMA uplink resource allocation focuses on two aspects: one is to maximize the transmission rate of each user, the other is to minimize power. But both of them do not consider the power efficiency of each user. To deal with this problem, in this paper, a novel joint power and subcarrier allocation scheme in uplink OFDMA systems is proposed based on game theory. The goal is to maximize the power efficiency of each user under peak power constraint. For the purpose, the necessary condition for optimality using Karush-Kuhn-Tucker condition is drawn and the existence of the Nash Equilibrium of the function is proved. Then the subcarrier and power allocation algorithm is showed. The simulation results show that the power efficiency of the proposed algorithm increases greatly over that of the MaxRt+WF (Maximal marginal Rate subcarrier and WaterFilling power allocation), which is the optimal algorithm to derive the maximal transmission rate, and MaxFA+WF (Fixed subcarrier Allocation and WaterFilling power allocation). Meanwhile, if the pricing fact is properly chosen which the number is five in the simulation model, the sum of power efficiency can be maximized.

Key words OFDMA Power efficiency Resource allocation Game theory

DOI: 10.3724/SP.J.1146.2008.00401

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