

论文

基于认知OFDM的子载波功率分配改进算法

孙大卫, 郑宝玉, 许晓荣

南京邮电大学 信号处理与传输研究院

摘要:

在认知无线网络中, 建立了基于认知OFDM多载波资源分配数学模型, 在授权用户干扰受限条件下, 以最大化传输速率为目标进行认知用户的子载波功率分配。传统注水法被证明是最优的单用户子载波功率分配算法, 在传统注水法功率分配基础上, 提出了两种可行的子载波功率分配改进算法, 改进算法一是通过对水面值的粗略估计快速确定不分配功率子载波, 改进算法二不需要通过迭代计算水面值, 只通过线性计算就可以直接确定不分配功率的子载波, 且对授权用户不产生干扰。仿真结果表明, 在改进的两种子载波功率分配算法下, 认知用户的数据传输速率优于传统注水法功率分配时认知用户的数据速率, 所提改进算法具有自适应特性且计算复杂度大大降低。

关键词: 认知无线网络 认知OFDM 子载波功率分配 注水算法 计算复杂度

Improved Algorithms of Sub-carrier Power Allocation in Cognitive OFDM

SUN Da-Wei, ZHENG Bao-Yu, XU Xiao-Rong

Institute of Signal Processing and Transmission, Nanjing University of Posts and Telecommunications

Abstract:

Mathematical model of multi-carrier resource allocation in cognitive OFDM is constructed in Cognitive Radio Networks (CRN). Multi-carrier power allocation with the target of maximizing the transmit capacity of cognitive user is proposed under the condition of primary user's interference constraint. Traditional water-filling algorithm is regarded as the optimal sub-carrier power allocation algorithm for single user. In this paper, two improved multi-carrier power allocation algorithms based on water-filling are proposed. One of the improved algorithms can quickly determine the sub-carriers that do not require power injection by rough estimation of water level. The other one can directly determine the sub-carriers that do not require power injection by linear calculation. And there is no need for this algorithm to calculate the value of water level though iterative method. Meanwhile, all of them do not make any interference to primary user, which shows they are practical and feasible in CRN. Numerical results indicate that, the transmit capacity with the proposed power allocation algorithms are superior to that with traditional water-filling scheme for secondary user. However, the proposed sub-carrier power allocation algorithms could reduce the system computational complexity greatly and has some adaptive features.

Keywords: Cognitive Radio Networks(CRN) Cognitive OFDM(COFDM) Sub-carrier Power Allocation (SPA) Water-filling Algorithm(WFA) Computational Complexity(CC)

收稿日期 2009-12-06 修回日期 2010-03-26 网络版发布日期 2010-08-25

DOI:

基金项目:

国家自然科学基金(60972039)、江苏省研究生科研创新计划(CX09B_147Z)资助课题。

通讯作者:

作者简介:

作者Email: y080603@njupt.edu.cn

参考文献:

本刊中的类似文章

1. 肖小潮, 郑宝玉, 许晓荣. 协作MIMO中分布式空时编码技术的研究[J]. 信号处理, 2011,27(3): 340-345

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(852KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 认知无线网络
- ▶ 认知OFDM
- ▶ 子载波功率分配
- ▶ 注水算法
- ▶ 计算复杂度

本文作者相关文章

- ▶ 孙大卫
- ▶ 郑宝玉
- ▶ 许晓荣

PubMed

- ▶ Article by Sun, D. W.
- ▶ Article by Zheng, B. Y.
- ▶ Article by Xu, X. R.

2. 王磊, 郑宝玉, 崔景伍, 岳文静. 认知无线网络中一种新的频谱共享方法[J]. 信号处理, 2011,27(7): 961-966
3. 徐一, 侣秀杰, 刘文龙, 金明录. 基于多层循环搜索的部分传输序列算法[J]. 信号处理, 2011,27(10): 1599-1604

文章评论

| | | | |
|------|----------------------|------|---------------------------|
| 反馈人 | <input type="text"/> | 邮箱地址 | <input type="text"/> |
| 反馈标题 | <input type="text"/> | 验证码 | <input type="text"/> 2300 |