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论文与技术报告

基于NC-OFDM的认知无线电自适应动态资源分配算法

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摘要:

如何提高无线电资源的利用率已经成为国内外研究的一个热点, 而认知无线电技术为解决这个问题提供了一个新思路。非连续正交频分复用(NC-OFDM)技术灵活的选频方案为实现认知无线电系统提供了良好的平台。本文针对NC-OFDM系统的特点, 提出了一种新的无线电资源分配算法, 在该算法中认知无线电用户根据感知的资源环境, 针对用户的带宽以及QoS等要求, 在“比例公平”原则下通过对子载波和功率的分配使得整个信道容量达到最大。本算法引入了“衰减因子”和用户设备终端, 在不干扰授权用户通信的前提下进行多用户子载波和功率的分配。计算机仿真结果表明: 在多径衰落信道下, 与FDMA分配方案相比, 本文中算法的信道容量得到了显著的提高, 其误码率相比于等比特分配算法也有了明显的降低。

关键词: 认知无线电(CR) 非连续正交频分复用(NC OFDM) 子载波分配 功率分配

Adaptive Dynamic Resource Allocation in Cognitive Radio System based on NC-OFDM

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Abstract:

How to improve the efficiency of radio resources which attracts a lot of interest becomes a hot spot problem. The cognitive radio (CR) technology is a new method for solving this problem. And the Non-Contiguous Orthogonal Frequency Division Multiplexing (NC-OFDM) technology provides a good platform for CR systems because of its agile choice mechanism of frequency. This paper introduces a novel adaptive dynamic resource allocation scheme for NC-OFDM based CR system. In this scheme, the secondary users choose their subcarriers and powers to achieve their QoS requirements based on the knowledge of channel detections and proportional fairness principle. The maximal channel capability is achieved accordingly. Meanwhile a decline parameter and terminal types are also introduced during the subcarriers and power allocation, so the interference to the primary users is avoided. The simulation results show that the channel capacity of this algorithm has been improved significantly compared with FDMA and bit error rate compared to same bit allocation algorithm has also been significantly reduced in frequency selective fading channels.

Keywords: Cognitive Radio (CR); Non Contiguous Orthogonal Frequency-Division Multiplexing (NC-OFDM) Subcarrier Allocation; Power Distribution

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