

论文

基于优化多带复小波和Turbo编码的多载波CDMA系统及性能

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摘要

在分析多载波CDMA (MC-CDMA) 技术原理的基础上, 利用优化的多带复小波作为多载波调制以及turbo 编码作为信道编码, 提出一种基于优化多带复小波和turbo编码的MC-CDMA系统, 研究了其在瑞利衰落信道下的误比特率性能。该系统能克服通常MC-CDMA系统插入循环前缀(CP)所带来频谱效率的降低, 并能充分利用turbo编码的良好抗信道衰落能力, 进一步提高系统性能。理论分析和仿真结果表明该系统性能要好于通常MC-CDMA系统, 具有与采用CP的MC-CDMA系统相比较的优势。同时turbo编码的应用显著增强了系统抗多径衰落和多址干扰的能力。

关键词 [多带复小波](#) [turbo编码](#) [多载波技术](#) [码分多址](#) [正交频分复用\(OFDM\)](#)

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Performance of Multi-carrier CDMA System Based on Optimized Multiband Complex Wavelet and Turbo Coding

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Abstract

In this paper, on the basis of analyzing the principle of Multi-Carrier Code Division Multiple Access (MC-CDMA) technique, by adopting the optimized multiband complex wavelet as multi-carrier modulation and the turbo codes as channel coding, a MC-CDMA system based on optimized multiband complex wavelet and turbo coding is proposed, and the system bit error rate performance is investigated in Rayleigh fading channel. The system can overcome the decrease of efficiency of spectrum and energy of conventional MC-CDMA due to inserting Cyclic Prefix (CP); and make full use of the turbo codes' good capacity against fading channel to improve the system performance further. Theoretical analysis and simulation results all show that the proposed system outperforms conventional MC-CDMA system, and the performance of the system is superior to that of the conventional MC-CDMA with CP. Meanwhile, the application of turbo coding strengthens the system ability to cope with multi-path fading and Multi-Access Interference (MAI) significantly.

Key words [Multiband complex wavelet](#) [Turbo coding](#) [Multi-carrier technique](#) [Code Division Multiple Access \(CDMA\)](#) [Orthogonal Frequency Division Multiplexing \(OFDM\)](#)

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