

论文与技术报告

异步DS-CDMA系统中的盲联合干扰消除与多用户检测

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摘要:

针对异步DS-CDMA系统存在强恶意干扰时, 系统性能急剧下降的问题。本文提出一种采用双天线接收的盲联合干扰消除与多用户检测方案。不同于传统的多用户检测方法, 该方案考虑了恶意干扰的影响, 首先通过串并变换将恶意干扰等效为多路信号, 然后利用双天线接收到的两路受扰信号构造超定或适定盲源分离模型, 将干扰消除与多用户检测问题转化为一相关源的盲分离问题, 最后利用基于最大非高斯性盲源分离算法进行分离, 从而实现盲联合干扰消除与多用户检测。该方案可以在未知扩频序列以及信道信息的情况下完成多用户检测, 同时实现恶意干扰的消除, 提高了系统的抗干扰能力。仿真结果表明该方案对单音干扰、部分频带干扰以及扫频干扰均具有一定的鲁棒性。

关键词: 码分多址; 干扰消除; 多用户检测; 盲源分离; 最大非高斯性

Blind Joint Jamming Cancellation and Multi-user Detection for Asynchronous DS-CDMA Systems

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Abstract:

Aiming at the problem that the performance of asynchronous DS-CDMA system may be significantly degraded if a hostility jamming exists in system, we propose a blind joint jamming cancellation and multi-user detection scheme based on dual-antenna receiving for DS-CDMA system with hostility jamming. Taking the effect of hostile jamming into consideration, the algorithm firstly forms an overdetermined or determined blind source separation (BSS) model by treating the hostile jamming as multiple signals after series to parallel transformation, and then realizes blind jamming cancellation and multi-user detection by using BSS algorithm based on non-Gaussianity measure. The proposed scheme can realize multi-user detection and hostile jamming cancellation simultaneously without the knowledge of spread sequences and channel state information. Simulation results demonstrate that this scheme is valid for multiple kinds of hostile jamming.

Keywords: DS-CDMA jamming cancellation multi-user detection blind source separation maximum non-Gaussianity

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