电子与信息学报 2010 32 (1): 123-128 ISSN: 1009-5896 CN: 11-4494/TN

论文

MIMO-OFDM系统的低复杂度递推信道跟踪算法

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收稿日期 2008-12-8 修回日期 2009-5-18 网络版发布日期 2010-1-12 接受日期

摘要
该文针对时变多径信道下的MIMO-OFDM系统，基于变分贝叶斯原理，提出了一种新的联合信号检测和信道跟踪的低复杂度半盲贝叶斯迭代接收机。针对该接收机，基于递推变分期望最大化(RVBEM)算法，提出了一种RVBEM信道跟踪算法。由于RVBEM算法需要进行矩阵求逆，因此以该算法为基础推导得到了一种时频域联合递推的低复杂度信道跟踪(TF-LCRVBEM)算法。TF-LCRVBEM算法不仅完全避免了矩阵求逆运算，还通过合理的近似使得算法只具有线性复杂度。分析和仿真表明，在时变多径信道下，所提迭代接收机具有远优于传统接收机和接近理想接收机的性能。

关键词 MIMO-OFDM系统 变分贝叶斯 贝叶斯迭代接收机 信号检测 递推信道跟踪

分类号 TN92

Low Complexity Recursive Channel Tracking Algorithms for MIMO-OFDM

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Abstract

Based on the Variational Bayes (VB) method, a novel low complexity semi-blind Bayesian iterative receiver with joint signal detection and channel tracking is proposed for MIMO-OFDM systems over time-varying multi-path channel. Using the VB Expectation-Maximization (VBEM) algorithm, a Recursive VBEM (RVBEM) channel tracking algorithm is derived for the newly proposed receiver. Since the RVBEM algorithm requires computation of matrix inversion, a Time domain and Frequency domain combined Low Complexity RVBEM (TF-LCRVBEM) algorithm is further proposed to reduce complexity. It is demonstrated that the TF-LCRVBEM algorithm completely avoids matrix inversion and obtains linear complexity by making some reasonable approximations. The simulation results show that the proposed receiver not only outperforms the conventional receiver, but also can achieve near optimal performance.

Key words MIMO-OFDM system Variational Bayes (VB) Bayesian iterative receiver Signal detection Recursive channel tracking

DOI: 10.3724/SP.J.1146.2008.01667

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