

研究简报

协作MIMO中一种新的分布式VBLAST自适应DFE算法

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收稿日期 2009-1-21 修回日期 2009-7-13 网络版发布日期 2010-1-13 接受日期

摘要

具有低检测复杂度且可快速收敛的自适应空时均衡算法是实现多用户协作MIMO分布式空时编译码的关键。该文研究了分布式垂直型贝尔实验室分层空时编码(D-VBLAST)在多天线接收端的空时判决反馈均衡(DFE),提出了基于最小二乘准则的RLS-MIMO-DFE检测算法。相对于分布式VBLAST的极大似然(ML),迫零-排序串行干扰消除(ZF-OSIC)等检测算法,该算法可以达到快速收敛,且具有较低检测复杂度。理论计算和仿真研究表明,在分布式VBLAST系统中,尽管RLS-MIMO-DFE算法性能稍逊于ML检测,但该算法可以有效折衷检测性能与计算复杂度,且自适应信道变化,可满足协作MIMO下行链路节点的实时性处理要求。

关键词 [协作MIMO](#) [分布式VBLAST](#) [RLS-MIMO-DFE](#) [ML检测](#) [算法复杂度](#)

分类号 [TN929.5](#)

A Novel Distributed VBLAST Adaptive DFE Algorithm in Cooperative MIMO

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Abstract

The significant problem for the implementation of distributed space-time encoding and decoding in multi-user cooperative MIMO is the adaptive space-time equalization algorithm with low detection complexity and fast convergence property. Space-time Decision Feedback Equalization (DFE) at multi-antenna receiver in Distributed Vertical Bell Labs Layered Space-Time (D-VBLAST) system is studied. RLS-MIMO-DFE detection algorithm based on Least Square (LS) criterion is proposed. Compared with other D-VBLAST detection algorithms such as Maximum Likelihood (ML), Zero Forcing Ordered Successive Interference Cancellation (ZF-OSIC), the proposed algorithm has the unique property such as the fast convergence and the lower detection complexity. Theoretical derivation and simulated results show that, in D-VBLAST system, although the performance of RLS-MIMO-DFE is a bit inferior to ML detection, the proposed algorithm could compromise the detection performance and computation complexity efficiently, and adapt to channel variation simultaneously. Thus it could satisfy real-time requirements for cooperative nodes in downlink channel.

Key words [Cooperative MIMO](#) [Distributed VBLAST](#) [RLS-MIMO-DFE](#) [ML\(Maximum Likelihood\) detection](#) [Algorithm complexity](#)

DOI: 10.3724/SP.J.1146.2009.00117

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