MIMO系统联合参数估计

董伟, 李建东, 吕卓, 贺鹏

(西安电子科技大学 综合业务网理论及关键技术国家重点实验室 信息科技研究所 宽带无线通信实验室，陕西 西安 710071)

摘要　针对多输入多输出系统的联合频偏信道估计问题，考虑了更一般的模型(每一根发送天线到每一根接收天线之间的频偏是不同的)，研究了频偏和信道的最大似然估计，分析表明该估计问题包含一个多维搜索过程. 为了解决上述复杂的估计问题，提出了一种联合频偏信道估计新方法，首先根据粒子群优化理论估计出多个发射天线到某一接收天线的频偏，然后再利用最大似然估计器对信道增益进行估计. 仿真结果表明，与基于相关的估计算法相比，所提出的算法有更大的频偏估计范围，且估计值的均方误差渐近达到Cramer-Rao下界.

关键词　粒子群优化　MIMO　频偏估计　信道估计　最大似然估计

分类号　TP18

Joint parameter estimation for MIMO systems

DONG Wei, LI Jian-dong, L Zhuo, HE Peng

(Broadband Wireless Communications Lab., Research Inst. of Information Security & Privacy, State Key Lab. of Integrated Service Networks, Xidian Univ., Xi′an 710071， China)

Abstract

This paper addresses the problem of frequency offsets and channel gains estimation for a multi-input multi-output (MIMO) system in flat-fading channels. The general case where frequency offsets are possibly different for each transmit antenna is considered. The maximum-likelihood(ML) estimation of the joint frequency offsets and channel gains is investigated, assuming that a training sequence is available. The exact solution to this estimation problem turns out to be too complex as it involves a search over a multi-dimensional domain. To solve this complex estimation problem, a novel joint estimation algorithm for frequency offsets and channel gains is proposed. The new algorithm involves two steps. Frequency offsets are first estimated by the particle swarm optimization(PSO) theory. Then channel gains are estimated by the ML estimator. Simulation results show that the proposed algorithm has a larger frequency offset estimation range than the correlation-based estimation algorithm and asymptotically achieves the Cramer-Rao lower bound (CRLB).

Key words particle swarm optimization MIMO frequency offsets estimation channel estimation maximum-likelihood estimation

DOI:

通讯作者　董伟 wdong_piao@163.com

扩展功能

本文信息

- Supporting info
- PDF(774KB)
- [HTML全文](0KB)
- 参考文献

服务与反馈

- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- 复制索引
- Email Alert
- 文章反馈
- 浏览反馈信息

相关信息

- 本刊中 包含"粒子群优化"的相关文章
- 本文作者相关文章
  - 董伟
  - 李建东
  - 吕卓
  - 贺鹏