

应用 基于连续相位调制的协同分集系统在平坦衰落信道下的容量分析

胡均秀, 雷霞, 李强

电子科技大学通信抗干扰技术国家级重点实验室

摘要:

连续相位调制 (CPM) 由于其相位连续和恒包络, 可以使用低成本的非线性功率放大器, 且CPM信号有近于1的峰均功率比, 在放大器处产生的能量消耗小, 从而解决协同系统中移动终端的成本和能量受限问题。本文针对平坦衰落信道下的CPM协同通信系统, 研究了可表征系统容量下界的对称信息率 (SIR)。分析和数值结果表明, 协同 CPM系统与单入单出CPM系统相比, 能获得更大的信道容量, 同时还拥有更低的中断概率。进一步地, 以最大化系统遍历容量为目标, 在考虑路径损耗的条件下, 对系统的最优中继位置问题进行了讨论。分析和数值结果表明, 对比中继位置在对称中点的系统, 最优中继位置系统的信道容量获得明显提升。进一步, 研究了信道估计误差和SNR估计误差对CPM协同通信系统的容量的影响。

关键词: 协同通信; 连续相位调制; 对称信息率; 最优中继位置; 信道估计误差; SNR估计误差

Capacity for cooperative diversity system based on continuous phase modulation in flat fading channel

HU Di-Xiu, LEI Xia, LI Qiang

National Key Laboratory of Science and Technology on Communications, University of Electronic Science and Technology of China Chengdu

Abstract:

Cooperative diversity is an efficient technology to combat fading and reduce transmission terminals' required power, but there are energy and cost constraints of transmission terminals. These problems can be solved by using continuous phase modulation, which has a near-unity Peak-to-Average Power Ratio. Thanks to the property of its continuous phase and constant envelope, CPM signals are applicable to low-cost nonlinear power amplifier. In this paper, capacity of cooperative transmission system based on CPM is studied. A lower bound on the capacity, which is called symmetric information rate, is given for CPM-based cooperative diversity system in flat fading channel. The calculation of SIR is based on BCJR algorithm and information theory. The analysis and numerical results show that the CPM cooperative diversity system can get a higher capacity and a lower outage probability than CPM SISO system. Further more, aiming at maximizing ergodic capacity, optimal relay location strategy is discussed and obtained when considering path loss. The analysis and numerical results show that, comparing to symmetric relay location scheme, the optimal relay location system can get obviously higher capacity. And then, capacity for CPM cooperative diversity system with imperfect channel estimation and imperfect SNR estimation are studied.

Keywords: cooperative communication continuous phase modulation symmetric information rate optimal relay location imperfect channel estimation imperfect SNR estimation

收稿日期 2011-01-24 修回日期 2011-04-29 网络版发布日期 2011-07-25

DOI:

基金项目:

国家自然科学基金资助项目 (60972029)

通讯作者:

作者简介:

作者Email: hudixiu@163.com

参考文献:

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1129KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 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
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- 协同通信; 连续相位调制;
- ▶ 对称信息率; 最优中继位置;
- 信道估计误差; SNR估计误差

本文作者相关文章

- ▶ 胡均秀
- ▶ 雷霞
- ▶ 李强

PubMed

- ▶ Article by Hu, D. X.
- ▶ Article by Lei, X.
- ▶ Article by Li, Q.

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="9774"/>