

论文

## 多用户MIMO-OFDM系统低速率CSI反馈方法及信道容量分析

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收稿日期 2008-7-8 修回日期 2009-5-26 网络版发布日期 2009-9-2 接受日期

摘要

该文针对闭环多用户MIMO-OFDM系统提出一种基于线性预测的低速率CSI (Channel State Information) 反馈方法。根据相关带宽将OFDM子载波划分成多个子带, 移动台对每个子带的CSI作线性预测, 并对预测误差进行量化编码后反馈给基站; 基站使用相同的线性预测滤波器将反馈来的预测误差恢复成CSI, 然后在每个子带上通过迫零-波束赋形实现多用户空间复用。同时, 该文还在采用注水定理分配发射功率的条件下, 从理论上分析了下行链路信道容量。数值仿真结果显示, 每个反馈数据的实部或虚部仅用1bit量化时, 本方法仍能够以较高的精度恢复CSI。与目前3GPP LTE标准所采用的基于码书的反馈方案相比, 该方法能够在反馈开销相同情况下, 有效地抑制同信道干扰, 大幅提高系统容量。

关键词 [MIMO-OFDM](#) [子带](#) [线性预测](#) [信道状态信息](#) [反馈](#)

分类号 [TN929.53](#)

## Low Rate CSI Feedback and Capacity Analysis in Multiuser-MIMO-OFDM System

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Abstract

A low rate CSI (Channel State Information) feedback scheme based on linear prediction is proposed for closed-loop multi-user MIMO-OFDM systems. The subcarriers in OFDM system are divided into several sub-bands according to the coherence bandwidth. MS (Mobile Station) predicts CSI of each sub-band, then feedbacks the quantized and coded prediction error to BS (Base Station). BS recovers CSI from feedback information with the same linear predictor, and performs multi-user spatial multiplexing by zero-forcing beamforming with recovered CSI. The downlink capacities are analyzed in theory, where water-filling power allocation method is assumed. Numerical simulations verify that, BS can recover CSI precisely even if the feedback data (real part or imaginary part) is quantized only by one bit. Compared with the 3GPP LTE's feedback scheme based on codebook, the proposed scheme can suppress CCI better, and achieve much larger capacity. Meanwhile the feedback payload is same as that of 3GPP LTE's scheme.

Key words [MIMO-OFDM](#) [Sub-band](#) [Linear prediction](#) [Channel State Information \(CSI\)](#) [Feedback](#)

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