

论文

基于多中继导频频分复用的协同通信系统信道估计算法

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摘要:

本文针对频率选择性衰落环境下结合正交频分复用技术的放大转发多中继协同通信系统, 提出了基于导频频分复用的频域信道估计算法, 包括最小二乘(LS)估计算法和线性最小均方误差(LMMSE)估计算法。理论分析和仿真结果表明, 该算法不仅成功分辨了多中继协同通信系统的所有频域信道衰落系数, 避免了各中继节点转发的导频符号在目的节点上的混叠干扰, 而且减少了频域信道估计所需的导频符号数量和时隙周期长度, 提高了协同通信系统的传输效率和频谱利用率, 同时显著提高了信道估计的精度, 降低了算法的复杂度, 具有较高的实用价值。

关键词: 协同通信 信道估计 导频频分复用

A Channel Estimation Algorithm for Cooperative Communication System Based on Multi-Relay Pilot Frequency Division Multiplexing

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Abstract:

A training sequence aided frequency-domain channel estimation algorithm based on pilot frequency division multiplexing was proposed for orthogonal frequency division multiplexing (OFDM) based amplify-and-forward (AF) cooperative communication system with multiple relay nodes over frequency-selective fading channels, including least squares (LS) estimation method and low-rank linear minimum mean square error (LMMSE) estimation method. Theoretical analysis showed that the proposed algorithm achieved the entire frequency-domain channel fading coefficients of the multi-node AF cooperative communication system successfully and avoided the superposition of the pilot symbols transmitted by different relay nodes. The proposed algorithm with much better performance needed less pilot symbols and time slots for channel estimation than the traditional algorithm, which improved the transmission capacity and spectrum efficiency of the AF cooperative communication system. And the lower complexity and the higher practicality and accuracy of the proposed algorithm were confirmed by the simulation results.

Keywords: cooperative communication channel estimation pilot frequency division multiplexing

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