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分布式空频编码协同通信系统中基于导频转发新时序的信道估计算法

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Channel Estimation Based on a New Pilot Forwarding Schedule for Distributed Space-Frequency Coded Cooperative Communication System

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摘要 该文针对频率选择性衰落下的多中继分布式空频编码协同通信系统，提出了基于导频转发新时序的频域信道估计算法，包括最小二乘(LS)估计算法和低阶近似的线性最小均方误差(Lr-LMMSE)估计算法。互相协同的各中继节点在收到源节点广播发送的频域导频符号向量后，通过互不相同的时隙将其转发给目的节点，从而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。理论分析和仿真结果表明，该算法成功地分辨了多中继协同通信系统的所有频域信道系数，其估计精度高，算法复杂度低，具有较高的实用价值。

关键词： 协同通信　信道估计　分布式空频编码　导频转发时序

Abstract： Several frequency-domain channel estimation algorithms based on a new pilot forwarding schedule are proposed for distributed space-frequency coded cooperative communication system with multiple relay nodes over frequency-selective fading channels, including the Least Square (LS) method and the Low rank Linear Minimum Mean Square Error (Lr-LMMSE) method. The cooperative relay nodes forward the pilot vector sent by the source node to the destination in different time slots, so that the superposition of the pilot signals transmitted by different relay nodes is avoided. Theoretical analysis showes that the proposed algorithms achieve all the frequency-domain channel fading coefficients of the multi-relay distributed SF coded cooperative communication system successfully. Simulation results confirm the performance of the proposed channel estimation algorithms, including the high accuracy, extraordinary practicality and the low complexity.

Keywords： Cooperative communication   Channel estimation   Distributed space-frequency coding   Pilot forwarding schedule

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