

应用

多普勒域上稀疏的双向中继信道估计

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摘要:

信道估计技术作为获得信道衰落信息的方法, 是提高无线信道传输接收性能的关键技术。本文针对放大转发双向中继系统的时间选择性平坦衰落信道, 利用信道在多普勒域的稀疏性进行压缩信道估计。相比于传统的线性估计方法, 压缩信道估计考虑了信道的固有稀疏性, 降低了导频的开销, 改善了信道估计性能, 提高了频谱利用率及系统吞吐量。文中通过对双向中继信道进行多普勒域的稀疏建模, 仿真分析了信道估计性能随着导频数量增加、信噪比增加, 得到不断改善; 而不同的导频分布将影响观测矩阵的相关度, 从而对信道估计产生影响。仿真表明, 当导频随机分布时, 信道估计效果最佳。同时, 文中还仿真分析了最大多普勒频移对信道估计性能的影响。

关键词: 放大转发双向中继网络; 压缩信道估计; 多普勒稀疏; 时间选择性平坦衰落信道; 导频分布相关度

Compressed Channel Estimation for Two-way Relay Network over Doppler sparse environment

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Abstract:

Channel estimation which can acquire the channel fading information is a key technology to improve the performance in wireless channel transmission. In this paper, we consider the estimation of Doppler sparse time-selective channels in AF-TWRN. Compared to the traditional linear estimation method, the compressed sensing-based channel estimation method has taken the inherent sparseness of wireless channel into account, which reduces the number of pilots, improves the channel estimation performance and the system throughput, raises the spectrum efficiency. We firstly establish the Doppler sparse model of AF-TWRN, then analyze the channel estimation performances improved with the increase of pilot number and SNR. Different pilot patterns will affect the correlation of measurement matrix, which can furtherly affect the channel estimation. Simulation results demonstrate that using the random pilot pattern gives much better estimation performance than other pilot patterns. Furthermore, we analyze the influence of maximum Doppler frequency shift on estimation performance.

Keywords: amplify-and-forward two-way relay network (AF-TWRN) compressed channel estimation Doppler sparse time-selective channels pilot pattern correlation

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