

短文与研究通讯

网络编码双向机会协作系统无线传输方案频谱效率比较分析

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摘要:

文章对放大转发双向机会协作通信系统(OR-TW-AFNC)的频谱效率进行了详细地研究, 运用适当的数学证明和近似分析获得了OR-TW-AFNC系统两时隙、三时隙和四时隙传输方案平均“和速率”的近似封闭解析解。数值分析结果表明, 对于OR-TW-AFNC系统的三种不同传输方案, 依不同的信道实现和信噪比范围, 这三种系统的频谱效率是不同的; 特别是在低信噪比区域, 由于三时隙方案有效地利用了直径传播信号, 其相应的频谱效率要高于两时隙方案。与此同时, 比较分析结果也表明文章所得近似封闭解析解是正确的、可靠的。

关键词: 机会协作; 放大转发; 网络编码; 频谱效率

Spectral efficiency comparison analysis of wireless transmission schemes for two-way network coding opportunistic relaying systems

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Abstract:

The spectrum efficiency of two-way opportunistic relaying with amplify-and-forward network coding systems (OR-TW-AFNC) is investigated in detail. In general, it is believed that there are three transmission schemes for two-way opportunistic relaying, i.e., two slots, three slots, and four slots schemes. By using the appropriate approximate mathematical manipulation, we obtain the closed-form analytical expressions to the average sum rates of the three transmission schemes. The comparison analysis shows that the spectral efficiencies of the three two-way opportunistic relaying systems are determined by the practical channel state and signal-to-noise ratio (SNR) region. Under certain channel gains and SNR region, the three slots schemes can outperform the two slots ones, especially in low SNR. This is due to the fact that the three slots scheme utilizes the signal from direct link. At the same time, the comparison numerical results validate the derivations, effectively.

Keywords: opportunistic relaying amplify-and-forward network coding spectral efficiency

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