

### 物理层网络编码机会中继及中断性能分析

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## Opportunistic Relaying and Outage Analysis for Physical-layer Network Coding

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摘要

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**摘要** 该文研究了频率非选择性瑞利衰落信道中的物理层网络编码系统容量问题。基于放大转发机制提出了一种基于最大最小互信息准则的机会中继策略。在瑞利衰落信道环境下,从双向通信的角度,通过理论分析得出其中断概率解析式,同时推导了理想物理层网络编码和传统直接传输系统的中断概率解析式。通过理论分析,发现在某些节点发射功率条件下,系统中断概率将完全取决于单向链路。在此基础上完成了数值仿真实验,结果表明所提策略的中断性能与理想物理层网络编码和传统直接传输相比有了显著的提高。

**关键词:** 物理层网络编码 中继选择 机会中继 中断概率

**Abstract:** The capacity issue of Physical-layer Network Coding (PNC) is investigated. According to the Max-Min Mutual Information (MMMI) criterion, a new opportunistic relaying scheme is proposed based on Amplify-and-Forward (AF). Then, the outage probability expressions are derived for the new proposed scheme as well as the schemes of ideal PNC and traditional direct transmission in frequency-nonselctive Rayleigh fading channels. By the analysis, it is found that the system outage performance can be measured by one-way channel in some conditions, which are determined by the node transmission powers. Simulation results show that the outage performance is improved significantly when MMMI strategy is used.

**Keywords:** Physical-layer Network Coding (PNC) Relay selection Opportunistic relaying Outage probability

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