

论文

## ALOHA脉冲超宽带网络的性能分析

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摘要

脉冲超宽带(IR-UWB)系统的脉冲宽度极窄, 脉冲占空比极低, 使用跳时和时间分集传送。该文分析了分布式脉冲超宽带网络中采用ALOHA方式共享信道时帧传送失败的原因, 推导出帧传送失败的概率, 通过分析数据帧产生-缓冲-传送的M/G/1排队过程, 得到了网络吞吐、帧传送延时的公式。仿真结果说明, ALOHA脉冲超宽带网络的吞吐, 帧传送延时和网络稳定性能远远优于ALOHA载波调制技术网络。

关键词 [脉冲超宽带](#) [跳时](#) [ALOHA](#) [网络吞吐](#) [帧传送延时](#)

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## Performance Analysis of the ALOHA IR-UWB Network

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Abstract

An Impulse Radio UWB (IR-UWB) system uses very narrow pulses with time-hopping and time diversity to transmit data, where the signals have very low duty cycle. In this paper the cause of data frame transmission failure is analyzed in a distributed IR-UWB network using the ALOHA protocol, and the failure probability is derived. Based on queuing analysis of the data frame generating-buffering-sending process, the network throughput and frame transmission delay in closed-form expressions are obtained. Simulation results show that the throughput, frame transmission delay and stability of the ALOHA IR-UWB network is much better than those of the ALOHA network based on carrier modulation technology.

Key words [IR-UWB](#) [Time-Hopping](#) [ALOHA](#) [Throughput](#) [Frame transmission delay](#)

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