自动化学报 2007 33 (5): 500-505 ISSN: 0254-4156 CN: 11-2109/TP

论文与报告

论CSMA/CD协议的数学原理

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收稿日期 2005-9-20 修回日期 2006-6-20 网络版发布日期 2007-6-20 接受日期

摘要

CSMA/CD 网络在长期试错中已经从单总线型网络发展到了堆叠式网络, 但其不确定性本质上并未得到解决. 本文从数学原理角度推导了其不确定性解决的理论依据, 通过对堆叠式网络数学模型的抽象, 证明了堆叠式网络结构服从幂率变换定理, 在其时间敏感性上以幂率收敛方式优于单总线型网络, 并从网络吞吐量和网络传输效率性能分析评价了该模型. 最后, 总结出了CSMA/CD 的理论``究竟'', 拓宽了CSMA/CD 在嵌入式工业控制领域的``方便'' 应用.

关键词 CSMA/CD 不确定性 幂率变换 数学模型 时间敏感性

分类号 TP393.11

Demonstration of Mathematics Theory of CSMA/CD Protocol

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Abstract

The network based on CSMA/CD protocol has developed as not been solved essentially. In this paper, a theoretical foundation for resolving the uncertainty, is deduced from the angle of mathematics theory. By abstracting the mathematic model of stacking-type network, the structure of stacking-type network is proved to obey the theorem of power rate transition and to be better than the single bus-type network in that it has an exponentially convergent time-sensitivity. Furthermore, through analyzing the network capability of the network throughput and transmission efficiency, the model is evaluated. Finally the theoretical ``however'' of CSMA/CD is summarized and the applications of ``convenience'' of CSMA/CD in the embedded industrial control fields are widened.

Key words CSMA/CD uncertainty power rate transition mathematic model time-sensitivity

DOI: 10.1360/aas-007-0500

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