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论文与报告

过程TPN模拟方法用于两种现场总线网络的性能比较研究

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摘要
以具有过程说明的TPN为工具,对两种不同类型的Fieldbus网络性能进行了研究、分析和比较.在轮询协议中,采用了P/C通信模型,由主节点管理轮询队列;在令牌协议中,分别采用循环令牌和授权令牌来满足周期性和突发性通信需要,其中对网络响应时间、吞吐量和振颤等性能进行了重点讨论,给出了它们的性能差异和响应界限.

关键词 现场总线 TPN 轮询协议 令牌协议 工业自动化和过程控制

分类号

Study and Comparison of Two Tpyes of Fieldbus Network with TPN

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Abstract
Two efficient fieldbus protocol are studied, analyzeo and compared based on Timed Petri Net with procedures, in which transitions are described in high 1evel program Language. In the polling scheme, the producer/consumer communication model is used. Polling queues are managed by the master node. The polling request message is broadcasted to all nodes and the poll response message is broadcasted by the producer. In the token-passing scheme, the circulated token and the delegated token allow very different communication requires to be met respectively. They are managed by the arbitrator. Operations of two types of the fieldbus network models are simulated in the paper. The performances of response time, throughput and jitters are discussed in details. The differences of performances and the threshold of the response time with the limited jitters are given. The result show that: when the response time is greater than the threshold, the polling protocol in the fieldbus has a intrinsic rhythm and is very useful for the communication problems in continuous process control, the token passing protocol in the fieldbus just breaks the intrinsic rhythm and is better in discrete and hybrid process control.

Key words Fieldbus timed petri net polling protocol toker passing protocol factory automation and process control

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