论文

一种提高IEEE 802.11吞吐量和公平性的自适应优化算法

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摘要
该文提出了一种针对IEEE 802.11 DCF网络增强其吞吐量和公平性性能的自适应优化算法, 算法基于网络节点侦听信道得到的网络状态信息进行竞争发送的自适应调整以获得最优的网络性能, 称之为CSCC (Channel Sensing Contention Control)算法。算法采用了对节点的信道接入请求以概率参数P_T进行过滤的方法控制节点竞争接入信道的激烈程度, 其主要特点在于在优化调整过程中不需要进行计算复杂的网络节点数量估计, 并且可以在不同网络状态下围绕始终确定的优化目标进行参数优化调整。仿真实验结果表明, 算法能够适应不同节点数量和不同数据大小的网络进行自适应的网络优化调整, 并获得了系统吞吐量、碰撞概率、延迟、延迟抖动、公平性等多方面的性能改善。

关键词　　无线网络　 IEEE 802.11 DCF　MAC机制　 信道侦听　 自适应优化

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An Adaptive Optimization Scheme for IEEE 802.11 to Improve Throughput and Fairness Performance

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Abstract
In this paper, an adaptive optimization scheme for IEEE 802.11 DCF is proposed to enhance the throughput and fairness performance. The scheme is based on channel sensing result for network state information and thus it is called CSCC (Channel Sensing Contention Control). The key idea to approach optimal performance dynamically in the new scheme is that the transmission attempt from the DCF is filtered by an adjustable probability P_T. CSCC does not need to perform complex on-line estimation of the number of active stations in the network, and can make adaptive tuning always toward the certain optimization object under various network states. Detailed simulation results show that the scheme can effectively adapt to various networks different in station number and packet size, and consequently achieve performance improvements on several aspects including system throughput, collision probability, delay, delay jitter, fairness and so on.

Key words　 Wireless network　 IEEE 802.11 DCF　 MAC scheme　 Channel sensing　 Adaptive optimization

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