

博士论坛

基于UWB的无线传感器网络跨层优化模型研究

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摘要 跨层设计是提高无线传感器网络整体性能的一种有效方法。在综合考虑MAC层调度、物理层功率控制、网络层路由三方面因素的基础上, 结合超宽带技术大带宽、低信号功率的特点, 以实现网络最大数据传输速率为目标, 构建了基于超宽带技术的无线传感器网络跨层优化模型。仿真实验表明: 模型最优解可有效提高网络数据传输速率; 物理层功率控制对优化结果有着至关重要的影响。这证明以构建、求解优化模型的方式解决跨层设计问题是切实可行的, 同时也为解决大规模超宽带传感器网络数据传输问题提供了一条新的解决思路。

关键词 [超宽带](#) [无线传感器网络](#) [跨层设计](#) [优化模型](#)

分类号

Further research on cross-layer optimization model for UWB-based wireless sensor networks

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Abstract

Cross-layer design is a promising approach to promote the performance of wireless sensor networks. This paper studies an UWB-based wireless sensor networks and builds a cross-layer optimization model with joint consideration of MAC layer scheduling, PHY layer power control and of network layer. The optimization model takes advantage of unique properties of UWB technology, such as huge bandwidth, extremely low power spectral density and large processing gain in the presence of interference and intends to achieve the maximal data rate of whole network. Simulation results show that the optimal solution of cross-layer optimization model can increase the data rate of network obviously and power control in PHY layer has important influence on optimal solution. It demonstrates that it is feasible and effective to deal the cross-layer problem by building and resolving the optimization model and provides a novel approach to the address the data traffic issues for large-scale networks.

Key words [UWB](#) [wireless sensor networks](#) [cross-layer design](#) [optimization model](#)

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