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短文

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基于最优刚性图的链路质量与能量的拓扑控制算法

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Link quality and energy topology control algorithm based on optimally rigid graph

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摘要

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摘要

针对目前无线传感器网络研究中网络能量利用率低和通信链路不可靠等问题, 提出一种基于最优刚性图的网络拓扑优化算法. 该算法通过建立包含链路质量和能量两方面内容的链路权值函数来构建链路可靠性强、能量利用率高的网络拓扑结构. 研究表明, 所构建的拓扑具有平均节点度低和链路性能好等优越特性. 仿真结果表明, 与现有拓扑控制算法相比, 所提出的算法能够更有效地减少能量消耗, 从而延长网络寿命.

关键词: 无线传感器网络, 拓扑优化, 最优刚性图, 链路质量, 能量消耗

Abstract:

By noting the problem such as low energy efficiency and unreliable communication links in existing studies on wireless sensor networks (WSNs), a novel topology control algorithm based on the optimally rigid graph theory is proposed. A function, which can comprehensively reflect both link quality and energy consumption, is built to weight communication links with strong reliability and high efficient utilization of energy in the proposed algorithm. It is proved that the proposed algorithm has the properties of low average node degrees and good link performance. Finally, some simulation results show that the energy consumption can be reduced efficiently and network life can be prolonged by using the proposed algorithms, compared with the existing topology control algorithms.

Key words: wireless sensor network topology optimization optimally rigid graph link quality; energy loss

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