

基于随机行走机制的无标度网络拓扑演化模型

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摘要: 针对 WSNs (wireless sensor networks) 在实际应用中会遇到的能量耗尽及拓扑容侵效果不佳等难题, 构造拓扑模型时考虑节点剩余能量和节点间距离, 使剩余能量大的节点连接概率更高, 通过随机行走策略结合改进后的无标度网络“增长”和“择优连接”的方法, 提出了一种基于随机行走机制的无标度网络拓扑演化模型 (Random-walk Scale-free Topology Model, RSTM). 仿真结果表明, 该模型形成的网络拓扑不仅具备无标度网络的幂律特性, 且具备良好的稳定性和容错性.

关键词: 无标度网络; 拓扑演化; 随机行走; 能耗

The model of Scale-free Network Topology Evolution Based on the Random Walk Mechanism

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Abstract: Due to the difficulties that the dissipation of energy and the poor effect of intrusion tolerance of topology in the practical application of wireless sensor networks, the distance between nodes and the residual energy of nodes are considered when constructs the network topology, to make the residual energy of nodes connected probability is higher. By the methods of random walk strategy combined with the improved scale-free network "growth" and "preferential attachment", the random-walk scale-free topology model (RSTM) is proposed commensurately. The simulation results show that, the proposed topology not only has the power-law characteristic of scale-free network, but also posses a good stability and fault tolerance respectively.

Key words: scale-free network; topology evolution; random walk; energy consumption

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