

基于萤火虫算法的无线传感器网络移动 sink 节点路径规划方法

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摘要: 为了解决通信范围建模为圆形区域且存在相互重叠的无线传感器网络中移动 sink 路径规划这一 NP 难问题, 提出了一种新的基于萤火虫群的路径规划方法. 首先依据问题的特性对可行解空间进行了压缩; 然后为提高算法在高维解空间的搜索效率, 对离群萤火虫粒子设计了变异操作并设计了个体逐维移动的方式, 提高了算法的求解精度并加快了算法的收敛速度. 通过仿真实验分析及与其他算法的对比, 验证了该方法的有效性.

关键词: 无线传感器网络; 移动 sink; TSPN; 萤火虫优化算法; 进化算法

Path Planning in Wireless Sensor Networks for Mobile Sink

Based on Glowworm Swarm Optimization Algorithm

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Abstract: Mobile-sink shortest path planning problem can be regarded as a special case of TSPN problem, since the neighborhoods are the communication ranges of sensor nodes, which can be modeled as possibly overlapped disks. This problem is NP-Hard. To solve it, a novel glowworm swarm optimization based algorithm is proposed. At first, a search space reduction method is designed for compressing search space and improving efficiency of problem solving according to the nature of the problem. Then, a mutation operator for the outliers of the glowworms and an improved moving method are applied to improve the convergence speed and the quality of the result. The simulation results show that the proposed algorithm can achieve a better result than the related algorithms.

Key words: wireless sensor networks; mobile sink; TSPN; glowworm swarm optimization(GSO) algorithm; evolutionary algorithm

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