能量获取无线传感网能耗均衡分簇路由算法

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摘　要：针对大规模能量获取无线传感器网络能耗不均衡产生能量空洞现象，进而造成能源利用效率较低的问题，提出一种基于改进 GSA 的能耗均衡多跳分簇路由算法(VPMCR).通过合理的区域划分策略，控制网络各个区域簇头节点的数量，以均衡簇头节点能耗.通过最小化簇间数据传输总消耗得到最优的网络单元数.针对 GSA 算法收敛速度慢和容易陷入局部极值的问题，提出改进策略，利用改进 GSA 算法给出一种能耗均衡簇间路由方法，将能耗均衡性、能量状态等多种条件纳入适应度函数设计中，提高了路由阶段能耗均衡性.通过仿真验证，算法在平衡能量消耗、提升网络吞吐量方面的性能优于 PHC、AEHAC 和 NEEC 算法.

关键词：　能量获取无线传感器网络；GSA 算法；能耗均衡；分簇路由

Energy balanced clustering routing algorithm for energy harvesting wireless sensor network

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Abstract：In order to solve the problem of energy imbalance in large-scale energy harvesting wireless sensor network， resulting in energy hole phenomenon， which leads to low energy utilization efficiency， an improved energy-balanced multi-hop clustering routing algorithm (VPMCR) based on improved GSA is proposed. Through a reasonable regional division strategy，the number of cluster head nodes in each area of the network is controlled to balance the energy consumption of the cluster head nodes. The optimal number of network elements is obtained by minimizing the total consumption of data transmission between clusters. Aiming at the problem that the GSA algorithm is slow in convergence and easy to fall into local extremum， an improved strategy is proposed. An improved energy-balanced inter-cluster routing strategy is proposed by using the improved GSA algorithm， and various conditions such as energy balance and energy state are incorporated into the fitness. In the function design， the energy balance in the routing phase is improved. Through simulation verification， the performance of the algorithm in balancing energy consumption and improving network throughput is better than PHC， EBHAC and NEEC algorithms.

Key words： energy harvesting wireless sensor network; GSA algorithm; energy balance; clustered routing

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