

# 基于果蝇优化的 WSNs 三维节点定位算法

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**摘要:** 利用果蝇算法实现简单, 收敛速度快, 且有很高精度的优势结合三维空间定位特点, 提出一种基于果蝇优化算法 (FOA) 的三维传感器网络节点定位算法. 该算法将三维立体空间中未知节点与信标节点之间的估计距离和实际距离的误差值以 Taylor 级数展开, 作为果蝇优化算法中适应度函数, 依靠算法较强的全局的搜索能力及其自主寻优能力保留每一组中最接近实际值的坐标; 再通过算法的迭代比较, 从保留值中选出最优坐标. 仿真结果表明, 本算法具有定位精度高、复杂度低、鲁棒性好的特点; 并且通过与基于粒子群 (PSO) 的定位算法比较, 说明本算法其受到信标节点个数及通信距离变化的影响很小, 验证了算法的实用性.

**关键词:** 无线传感器网络; 三维定位; 果蝇优化算法; 定位精度; 智能定位

## Three-Dimensional Localization Algorithm Based on Fruit Flies Optimization Algorithm in WSNs

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**Abstract:** The fruit fly optimization algorithm (FOA) is simple, fast convergence and high accuracy, so a kind of three-dimensional localization algorithm based on FOA is put forward. The error of distance in three-dimensional between the unknown node and beacon node is expanded in a Taylor series as the fitness function of FOA. Relying on the strong global search ability and independent optimization ability of FOA, the most close to the actual value in each set of coordinates can be get; Through the algorithm of iterative comparison, choose the optimal coordinates from retain value. The simulation results show that the three-dimensional localization algorithm has the advantages of high precision, low computational complexity and good robustness; Compared with localization algorithm based on PSO, showing that localization algorithm based on FOA is effected by the changes of beacon nodes and the communication distance very small, this can verify the practicability of the algorithm.

**Key words:** wireless sensor networks; three-dimensional localization; fruit fly optimization algorithm; location accuracy; intelligent localization

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