

## 基于迭代的无线传感器网络三维定位算法

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摘要:

针对目前无线传感器网络三维空间定位存在精度不高、计算复杂、传输数据量大等问题, 提出了一种基于测距的分布式算法——高精度迭代三维定位算法(ILAH-3D)。该方法将经典二维算法AHLoS (Ad-Hoc Localization System)扩展到三维空间, 通过采用加权最小二乘法和加入定位节点升级锚节点的验证条件来减少累计误差, 提高节点定位精度, 并根据三维空间中节点的各种位置关系, 给出了约束协作算法的执行条件, 然后结合升级的锚节点再进行新一轮的定位运算。该方法计算简单、通信量小, 与已有三维定位算法相比, 在测距存在一定误差的情况下, 依然可以达到很好的精度。

关键词: 无线传感器网络; 三维定位; 迭代; 测距

## Iteration-Based Localization Algorithm for Wireless Sensor Network in Three-Dimensional Space

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**Abstract:**

There exist low precision, high computational complexity and large amount of data transmission for the localization problem of wireless sensor network in three-dimensional space. To overcome these shortcomings, a distributed algorithm based on distance is proposed, which is called iterative localization algorithm with high-precision (namely ILAH-3D). This method extends the classical two-dimensional algorithm AHLoS to be applied in the three-dimensional space. The cumulative errors can be reduced and localization precision can be improved by using the weighted least squares method and adding the upgraded validation condition of localized node. And the performing conditions of the constrained cooperation algorithm are given according to the various position relations of those nodes. Then localization algorithm of the new iteration is carried on by combining with the upgraded anchor nodes. The computing complexity of ILAH-3D is simple and its amount of communication is small. Compared with the existing three-dimensional localization algorithms, this proposed algorithm can achieve very good accuracy even though there are some errors in the ranging.

**Keywords:** Wireless sensor network, Three-dimensional localization, Iteration, Ranging

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