多站时差无源定位传感器网络优化

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摘 要：

在可移动无源传感器网络中，观测器与目标的相对几何关系对定位精度有重要影响。为提高对运动目标的定位跟踪精度，提出一种基于时差无源定位几何稀释精度的移动平台实时布站方法。首先推导出二维时差无源定位方法下的带有基线长度和基线偏角的GDOP表达式，将其作为目标优化函数，使用加权离散搜索优化算法求解网内各观测器每一时刻的最佳观测位置，并在此最佳位置对目标进行量测，完成目标运动分析。该方法通估计和优化相结合实现移动平台无源传感器网络的实时优化部署，仿真证明该算法一定程度上解决了时差无源定位算法的定位模糊问题，提高了对运动目标的跟踪精度。

关键词：可移动无源传感器网络；时差无源定位；几何稀释精度；优化布站；加权离散搜索优化算法

Sensor Network Optimization in TDOA Passive Location

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Abstract:

In mobile and passive sensor network, the relative geometric relationship between observers and target has a major impact to location and tracking accuracy. In order to improve tracking accuracy, a real time optimize embattle algorithm of mobile platforms based on the Geometric Dilution of Precision (GDOP) of time difference of arrival (TDOA) location system is proposed. First, an expression of GDOP with the baseline length and baseline orientation angle is deduced. As an objective optimization function, a weighted discrete search optimization algorithm is applied to calculate the optimal position which minimizes the objective function. And then, the measurements are obtained in this optimal position to achieve target motion analysis. The simulation results show that this algorithm can eliminate location ambiguity of TDOA algorithm and enhance tracking accuracy on moving targets.

Keywords: mobile and passive sensor network; time difference of arrival passive location; geometric dilution of precision; optimize embattle; weighted discrete search optimization algorithm

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