

算法研究

基于NLS的多机只测角误差配准算法

曲长文, 王昌海, 徐征

航空电子系统综合技术重点实验室; 海军航空工程学院电子信息工程系

摘要:

多机无源融合定位中的误差配准是目前多传感器误差配准中的难点之一。当无源传感器获得的观测量存在系统误差却不进行配准时, 多机融合定位的效果将受到严重影响。针对这一情况, 在多机只测角无源定位问题中提出了一种基于非线性最小二乘(NLS)的误差配准算法。该算法将多机只测角误差配准问题转换为非线性最小二乘估计问题, 并采用高斯-牛顿法求解, 即先将非线性量测方程线性化并采用加权最小二乘进行估计, 然后进行迭代直至收敛到最优估计值。仿真结果表明, 与EKF配准算法相比, 当观测时间足够长时, 本文提出的NLS误差配准算法的定位误差可以接近克拉美罗限(CRLB), 并且对系统误差的估计精度非常高。

关键词: 无源定位; 误差配准; 非线性最小二乘; 克拉美罗限

NLS-based Registration Algorithm for Bearings-Only Location by Multiple Airborne Observers

QU Chang-Wen, WANG Chang-Hai, XU Zheng

Abstract:

Registration for passive sensors on multiple airborne observers is one of difficult multi-sensor registration problems. The accuracy of location will be severely affected when the measurements taken by passive sensors consist of systematic biases without registration. A registration algorithm based on nonlinear least-squares (NLS) for bearings-only location by multiple airborne observers is proposed. The algorithm regards registration for multiple airborne bearings-only observers as an NLS problem, and solves it by Gauss-Newton Method. Firstly, linearize the measurement equations and estimate the parameters using the general least-squares method. Then execute the iterative procedure until the estimated parameters converge to optimal estimations. Simulation results show that, given enough measurements, the NLS-based registration algorithm proposed here can effectively estimate the systemic biases as well as the position of the target with the location error reaching the Cramer-Rao bound (CRLB) when compared with EKF-based registration algorithm.

Keywords: passive location; registration; nonlinear least-squares; the Cramer-Rao bound

收稿日期 2011-11-08 修回日期 2012-02-10 网络版发布日期 2012-04-25

DOI:

基金项目:

航空科学基金(20105584004)

通讯作者:

作者简介:

作者Email: qcwwby@sohu.com

参考文献:

本刊中的类似文章

文章评论

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(740KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 无源定位; 误差配准; 非线性最小二乘; 克拉美罗限

本文作者相关文章

- ▶ 曲长文
- ▶ 王昌海
- ▶ 徐征

PubMed

- ▶ Article by Qu, C. W.
- ▶ Article by Wang, C. H.
- ▶ Article by Xu, Z.

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="4260"/>