学术探讨

基于联邦UKF算法的移动机器人自主组合导航

郭剑辉[1], 赵春霞[1], 石杏喜[1, 2]

1.南京理工大学 计算机学院,南京　210094
2.南京理工大学 理学院,南京　210094

摘要　　组合导航技术是解决地面机器人自主导航的一个有效途径, 其中GPS/DR是一种典型的组合方式。常用的卡尔曼滤波主要用于处理线性问题, 针对该导航系统非线性的特点, 对Unscented卡尔曼滤波（UKF）与分散式滤波技术相结合的方法进行了研究, 建立了用于GPS/DR导航系统的联邦UKF算法。数值仿真实验表明, 联邦UKF比联邦EKF有更好的滤波精度,同时有更高的稳定性和容错性, 是一种理想的GPS/DR导航非线性滤波方法。
关键词　　自主组合导航　联邦UKF　EKF　非线性滤波
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Autonomous integrated navigation for mobile robot based on federated UKF algorithm

GUO Jian-hui[1],ZHAO Chun-xia[1],SHI Xing-xi[1,2]

1.Computer Department,Nanjing University of Science and Technology,Nanjing 210094,China
2.Sciences Department,Nanjing University of Science and Technology,Nanjing 210094,China

Abstract

　The integrated navigation technology can contribute greatly to solving land mobile robot autonomous navigation,in which the GPS/DR is one typical system.In view of the non-linear characteristic of the GPS/DR state equations,an improved federated UKF based on Unscented Kalman Filtering（UKF） and distributed information fusion technology is designed and used in the navigation system.Numerical simulation results indicated that,federated UKF has the better filter precision compared to federated EKF,simultaneously has a higher stability and the fault tolerance,is an ideal nonlinear filter method for GPS/DR navigation.
Key words　autonomous integrated navigation　federated Unscented Kalman Filtering　Extended Kalman Filtering（EKF）　nonlinear filtering

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通讯作者　郭剑辉 E-mail：dafeel2002@yahoo.com.cn

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