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系统工程

基于完好性风险估计减少RAIM误警率方法

杨传森[1,5],徐肖豪[2],刘瑞华[3],赵鸿盛[4]

1. 南京航空航天大学民航学院, 江苏 南京 210016;
2. 中国民航大学空管学院, 天津 300300;
3. 中国民航大学电子信息工程学院, 天津 300300;
4. 北京航空航天大学电子信息工程学院, 北京 100191;
5. 金陵科技学院机电工程学院, 江苏 南京 211169

摘要：

为了提供更精确的完好性服务，提出一种新型降低用户端自主完好性监测(receiver autonomous integrity monitoring, RAIM)误警率的方法。给出了定位误差与残差向量关系的新解释，基于最大定位误差完好性风险算法，提出了扩展正常检测区方法并进行故障检测，通过最大定位偏差保护限值提供故障检测的完好性保证，满足航段漏警率要求。最后，设计一种新的故障检测与故障识别准则，达到在不降低漏检率的条件下，减少误警率。算例表明该方法简单易行、有效。

关键词： 用户端自主完好性监测 误警率 漏检率 最小可测偏差 总体最小二乘法

Method for reducing probabilities of false detection of RAIM based on estimation of integrity risk

YANG Chuan-sen[1,5],XU Xiao-hao[2],LIU Rui-hua[3],ZHAO Hong-sheng[4]

1. College of Civil Aviation, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China;

2. College of Air Traffic Management, Civil Aviation University of China, Tianjin 300300, China;
3. College of Electronic Information Engineering, Civil Aviation University of China, Tianjin 300300, China;
4. School of Electronic Information Engineering, Beihang University, Beijing 100191, China;
5. School of Mechanical and Electrical Engineering, Jinling Institute of Technology, Nanjing 211169, China

Abstract:

In order to provide the accurate integrity service, a novel method of reducing the probability of false detection based on receiver autonomous integrity monitoring (RAIM) algorithm is proposed. A new explanation in relationship between the position bias and the residual is proposed. Then the method of expanding the normal detection zone based on the maximal positioning bias integrity risk algorithm is proposed for fault detection. In addition to meet the probabilities of missed detection for the corresponding flight phases, the maximal position error protection limit provides the integrity guarantee for fault detection. Moreover, without reducing the probability of missed detection, a new fault detection and fault identification criterion is designed to decrease the probability of false detection. Simulation results show that the proposed method is simple, feasible and effective.

Keywords: receiver autonomous integrity monitoring probability of false detection probability of missed detection minimal detectable bias total least square method

通讯作者：

作者简介：

作者Email：

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