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时-集综合的接收机自主完好性监测方法研究

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A Study on Time and Set Combined Method for Receiver Integrity Autonomous Monitoring

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摘要 提出了将时域处理和集合统计综合实现接收机自主完好性监测的方法。对卡尔曼滤波的新息检测方法进行了数学建模,分析了其优点和缺陷,并将其与基于瞬时(Snapshot)集合冗余一致性检测的RAIM的方法进行综合,称之为时-集综合的接收机自主完好性监测(TimeandSetCombinedReceiverIntegrityAutonomousMonitoring,TSC-RAIM)。计算机仿真结果表明,该方法不仅可以减少对可见星数目的要求,弥补SnapshotRAIM对多故障不敏感的缺陷,同时提高了故障检测的概率。

关键词: 卫星导航 接收机自主完好性监测 卡尔曼滤波 故障检测

Abstract: A new approach is put forward to combine the time-disposal and set-statistic for receiver integrity autonomous monitoring. Mathematic model for fault detect using the innovation of Kalman filter was described in detail. It's characters are analyzed latter. It is combined with snapshot RAIM method, which we call it TSC-RAIM(Time and Set Combined Receiver Integrity Autonomous Monitoring). Computer simulation is done to verify the validity of TSC-RAIM. The results show that this method increases the performance of fault detection, at the same time it decreases the required number of satellite in view, and compensates the weakness of snapshot RAIM for detecting multi-failure.

Keywords: GNSS RAIM Kalman filter fault detect

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