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系统工程

两种基于RAIM的多模卫星故障诊断与重构方法

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摘要：

基于接收机自主完善性监测(receiver autonomous integrity monitoring, RAIM)算法，研究了两种针对全球定位系统/全球导航卫星系统(global position system/global navigation satellite system, GPS/GLONASS)多模卫星的故障检测与诊断方法，并提出了一种在无法进行最小二乘解算情况下的故障快速重构方法，即用前面时刻解算的正确结果来快速预测当前时刻的导航定位信息。应用多模卫星接收机真实数据的验证结果表明，两种方法均能正确诊断出故障卫星，且能对故障进行有效重构。同时，在对两种方法的优缺点进行对比分析的基础上，指出具体应用何种方法要根据实际应用环境而定。

关键词： 多模卫星 故障诊断 自主完善性监测 最小二乘算法

Two methods for multimode satellite fault diagnosis and reconstruction based on RAIM

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Abstract:

The global navigation satellite system plays a more and more important role in navigation, so their reliability needs to be improved for the higher request. Two fault detection and diagnosis methods are studied based on receiver autonomous integrity monitoring (RAIM) algorithm for global position system (GPS)/global navigation satellite system (GIONASS) multimode satellite, and a fast fault reconstruction method is proposed in the condition that the least square solution is ineffective, which applies the correct results by resolving in the frontal time to forecast rapidly the navigation positioning information in current time. Based on real data from the multimode satellite receiver, the validation results indicate both the two methods diagnose the fault accurately and reconstruct the fault effectively. At the same time, it points out that the method is applied according to the application environment comparing the merits and demerits between them.

Keywords: multimode satellite fault diagnosis receiver autonomous integrity monitoring least square algorithm

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