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QUANTITATIVE EVALUATION METHOD OF NAVIGATION SATELLITE IN-ORBIT TEST BASED  
ON FUZZY METHOD

**Abstract**

Each sub-system of the navigation satellite needs to be tested in orbit to check whether its performance indicators meet the requirements in the initial stages of launching into orbit. In order to quantify the health assessment results of the navigation satellite in-orbit test. In order to quantify the health assessment results of the navigation satellite in-orbit test, an improved fuzzy synthetic operation condition assessment is presented. Firstly, a condition assessment framework of some subsystem is proposed by analyzing the physical structure and actual the telemetries. The deteriorative degree functions and variable weights of different indices layers are determined. Secondly, an improved fuzzy synthetic operation condition assessment method is then proposed by utilizing the concepts of the membership function and fuzzy theory. Finally, by the actual on-orbit test data of a satellite, the proposed evaluation method is used to calculate the health status of a sub-system of the spacecraft. By comparing the quantitative evaluation results with the traditional pass/fail evaluation methods based on expert knowledge, the quantitative evaluation method proposed in this paper is reasonable and more accurate.