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A FAULT TOLERANCE METHOD USING THE MULTIPLE HYPOTHESES WALD SEQUENTIAL PROBABILITY RATIO TEST FOR INTEGER AMBIGUITY RESOLUTION.

Abstract

As GPS carrier phase measurements are used it is essential to resolve integer ambiguities. The multiple hypotheses Wald sequential probability ratio test (MHWSPRT) is a method for resolving the integer ambiguities. The biggest advantage of the MHWSPRT is that this method has one simple unified step for estimation and validation in resolving the integer. The dynamic information can be added to MHWSPRT as constraint. It speeds up the resolution convergence time of the integer ambiguities. It is known that the improvement of convergence speed of the MHWSPRT is due to the increase the probability ratio with the use of the dynamic information constraints. The dynamic information make the state error covariance small, it helps to speed up the resolution convergence time. But this method has weakness when the system model has faults. This paper shows an advanced algorithm for resolving the integer ambiguities. It is possible to reduce the effect of the faults by using the null matrix of the measurement model matrix. It is shown that the proposed method is robust to the system model faults. The performance of the proposed method is demonstrated using numerical simulations.