

## 基于球面交点的AFM算法的误差分析与改进方法

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### Error Analysis and Improvement of the Ambiguity Function Method Based on the Intersection Point on Sphere

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摘要

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**摘要** 基于球面交点的模糊度函数法是一种利用GPS信号求解载体姿态的有效算法,但其成功率受观测噪声影响很大,针对这一问题,该文对该算法进行了误差分析并提出提高成功率的改进方法。首先将原算法推广到双差观测模型,然后分析噪声的统计特性和误差传播的特点,深入研究了其对姿态解算成功率的影响,最后通过整周模糊度识别算法降低求解过程对噪声的敏感性。实验表明:相比于原算法,改进算法有效地提高了GPS姿态解算的成功率,同时消除了原算法对公共时钟的限制。

**关键词:** 全球定位系统 姿态解算 模糊度函数法 适应度函数

**Abstract:** The improved Ambiguity Function Method (AFM) method of intersection point on sphere is an effective algorithm for attitude determination using GPS signal, but the success rate is influenced by observation noise significantly. To deal this problem, in this paper, the error analysis is given and a further improvement method is proposed. First the original algorithm is extended under the double difference observation model. Then the statistical properties of noise and error propagation characteristics are both analyzed, which are followed by in-depth study of its affects to the success rate of attitude determination. Finally the noise sensitivity of the solution process is reduced by integer ambiguity recognition algorithm. The testing results show that the success rate of GPS attitude determination of the proposed algorithm increases greatly over that of the original algorithm while the restriction on public clocks is eliminated.

**Keywords:** GPS Attitude determination Ambiguity Function Method (AFM) Adaptive function

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