

柔性基线抖动对星载双天线InSAR系统性能的影响分析

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Analysis of Spaceborne Dual-antenna InSAR System Characteristic Under Flexible Baseline Oscillation

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摘要

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摘要 该文针对星载双天线InSAR存在柔性基线抖动现象, 分析了其对系统主要性能的影响。首先建立了基线抖动模型, 在一定参数范围内, 得到了简化的副天线回波信号模型, 采用改进的2维频域算法可得原始回波数据; 分析波束失准并提出了一种波束对准方案; 阐述了低频/高频抖动对SAR图像与干涉图的影响。以典型系统参数为例, 数值模拟和理论分析结果一致, 可为系统设计和应用提供一定的理论参考。

关键词: InSAR 基线抖动 波束失准 干涉图

Abstract: The main performance of spaceborne dual-antenna InSAR system in case of flexible baseline oscillation is investigated. Based on the mast motion model, a reduced raw echo signal of the slave antenna is derived under a limited condition. Then, the antenna beam misalignment is analysed and an alignment scheme is proposed. Finally, the oscillation effect on the SAR image resolution and the interferogram coherence is expounded for both the slow and high frequency. In the example of typical system, theoretical analysis and numerical simulation conducted show the result is consistent, which could provide an reference for the system design and application.

Keywords: InSAR Baseline oscillation Beam misalignment Interferogram

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