

星载多基线InSAR理想相位图的快速仿真方法

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Fast Simulation Method of Ideal Phase Map for Spaceborne Multi-baseline InSAR

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摘要

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摘要 针对星载多基线干涉孔径雷达(InSAR)系统, 该文研究并提出了基于数字高程模型(DEM)数据、卫星轨道和基线信息的干涉图快速仿真方法。利用前向地理编码进行星载InSAR几何约束下的DEM模型匹配, 完成多基线InSAR干涉相位生成, 并通过多项式近似和混合迭代对模型匹配过程的优化。理论分析和仿真实验表明, 该方法在显著提高计算效率的同时, 保持了较高的相位生成精度, 并且对复杂DEM模型具有良好的迭代收敛性, 适于实现大场景复杂地形的星载多基线干涉相位快速仿真。

关键词: 干涉孔径雷达 多基线 相位仿真 地理编码

Abstract: Based on Digital Elevation Model (DEM) data, satellite orbit and baseline information, a kind of fast interferometric phase simulation method is investigated and presented for spaceborne multi-baseline InSAR system taking advantage of forward geocoding, the match of DEM model under strict spaceborne InSAR geometry is utilized to realize multi-baseline interferometric phase generation, and the match process is further optimized by polynomial approximation and hybrid iteration. Theory analysis and simulation experiments indicate that the proposed method can improve the computation efficiency with enough phase accuracy, as well as better iteration convergence property for complicated DEM model. Consequently, the method is suitable for efficient simulation of spaceborne multi-baseline interferometric phase for large and rugged terrain.

Keywords: Interferometric SAR (InSAR) Multi-baseline Phase simulation Geocoding

Received 2013-05-03;

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