



航空学报 » 2001, Vol. 22 » Issue (S1) :115-119 DOI:

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干涉SAR相位展开算法的比较和改进

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COMPARISON AND DISCUSSION OF INTERFEROMETRIC SAR PHASE UNWRAPPING ALGORITHMS

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摘要

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摘要 基于残差理论深入分析和比较了 2 种最主要的干涉 SAR 相位展开方法积分路径法和最小均方法的策略及性能。对加权最小均方算法从初始值和权值进行了讨论,给出了一种合成加权多重网格算法。该算法结合了分支阻断方法简单快速并有一致解的特点,使它为多重网格最小均方算法提供初始值,加速了多重网格算法的收敛;并采用由相位导数方差生成的二值质量图替代相关系数作为权值输入,增强了算法的适应能力及可靠性。实际 X-SAR 数据的相位展开处理结果验证了本文的分析和结论。

关键词: 干涉SAR 相位展开算法 相位导数方差加权 合成加权多重网格算法

Abstract: From the residue theory point of view, this paper gives a thorough study on the two kinds of mainly used phase unwrapping algorithms as well as a comparison. And then, the initial values and weights of weighted least squares algorithms are discussed and a synthetic weighted multigrid algorithm is given, which employs the fast and reliable output of Branch Cut method as the input of the multigrid algorithm to accelerate the convergence and uses a binary quality map derived from the phase derivative variance as the weights to make the algorithm more robust and reliable. Phase unwrapping results of X SAR data have shown the validation of the analysis.

Keywords: inter ferometr ic SAR phase unwr apping phase der ivative va ria nce synthetic multigrid algorithm

Received 2000-05-16; published 2001-11-25

引用本文:

李笑郁;毛士艺. 干涉SAR相位展开算法的比较和改进[J]. 航空学报, 2001, 22(S1): 115-119.

LI Xiao-yu;MAO Shi-yi. COMPARISON AND DISCUSSION OF INTERFEROMETRIC SAR PHASE UNWRAPPING ALGORITHM[J]. Acta Aeronautica et Astronautica Sinica, 2001, 22(S1): 115-119.

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