论文

一种机载SAR层析三维成像算法

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摘要
针对机载平台难以同时满足多基线SAR层析3维成像所要求的短基线及大孔径问题，本文提出一种基于稀疏信号表示的机载SAR层析3维成像算法。首先基于高频率SAR目标的多散射中心假设，将目标在第3维成像方向上建模为稀疏分布模型，进而根据观测系统几何及信号频率特征构建了冗余字典，从而实现了成像问题到稀疏信号表示问题的转化，并最终通过求解以稀疏性度量函数为正则项的不适定方程获得成像结果。通过仿真实例的成像结果阐述了算法参数对成像的影响，并通过对SAR层析3维成像的仿真结果证明了算法的有效性。
关键词　合成孔径雷达　层析　稀疏信号表示
分类号　TN957.52

An Algorithm for Airborne SAR Tomography 3D Imaging

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Abstract
In the applications of airborne multi-baseline SAR tomography, the baseline is needed to be small while the aperture is required to be large. However, it is difficult to meet the two conditions simultaneously. In this paper, the sparse signal representation is used to solve the SAR tomography with few baselines. Firstly, the targets are modeled as sparse based on the hypothesis of multi-center of scattering. And then, the redundant dictionary is constructed through the geometry of SAR observing system and the frequencies of signal. As a result, the SAR tomography is transformed into the problem of sparse signal representation. The imaging results are obtained by solving the ill-posed problem based on sparse regularization. The relationship between the parameters and the quality of imaging is shown through the processing of the simulated serial signal. Finally, the validity of algorithm is clarified by the results of the three-dimensional SAR tomography.
Key words　Synthetic Aperture Radar (SAR)　Tomography　Sparse signal representation

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