论文

调频连续波SAR非线性处理方法研究

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摘要
合成孔径雷达系统畸变引入的幅相误差严重影响了雷达的成像效果，必须予以校正才能获得高质量的图像。该文针对调频连续波SAR系统频率响应非理想特性引入的幅相误差以及信号扫频非线性误差对系统性能的影响，分析建立了存在系统误差的调频连续波SAR系统回波信号模型，研究了系统误差估计与校正的问题，并考虑小型化调频连续波SAR实时成像处理的需求，提出了一种改进的适合实时成像处理的调频连续波SAR的高精度非线性距离−多普勒成像处理算法。最后，通过理论推导和仿真分析，验证了算法的可行性和有效性。

关键词　合成孔径雷达　非线性　调频连续波　成像处理

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Non-linear Signal Processing for FMCW SAR

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Abstract
The inherent errors of radar system degrade seriously the performance of Synthetic Aperture Radar(SAR), and these errors should be calibrated to acquire high quality images. In this paper, to the issue of the impact of system errors and non-linearities in FMCW SAR, models of system errors are established, and then the estimation and calibration of system errors are investigated in detail. An improved non-linear high resolution range-Doppler algorithm for FMCW SAR is proposed, according to the requirements of mini-architecture and real-time in FMCM SAR imaging systems. Finally, the feasibility and validity of the presented algorithm is demonstrated with simulation.

Key words　Synthetic Aperture Radar(SAR)　Non-linearities　Frequency Modulated Continuous Wave(FMCW)　Imaging processing

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