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论文

一种适用于机载SAR的改进PACE自聚焦算法

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摘要
PACE算法是一种新的非模型的高性能SAR图像自聚焦算法，可以有效提取SAR图像中高频相位误差。由于PACE算法直接以图像相位误差校正值系列为待估计参量，计算量巨大，该文从提高PACE算法的执行效率的角度出发，提出了一种插值PACE算法(IPACE)。IPACE算法以图像对比度函数为目标函数，以待估计的相位校正矢量中的若干个相位校正值为自变量，通过拟牛顿算法迭代获得它们的最优估计，然后通过插值获得整个相位误差校正矢量的最优估计值。IPACE算法可以有效地减少待估计变量的个数，提高算法的执行效率，同时几乎不降低算法的聚焦性能。实际相位误差未知的超宽带SAR回波数据的聚焦结果表明了该算法能显著改善图像的质量，是一种鲁棒性良好的图像自聚焦算法。

关键词 SAR；PACE；自聚焦；对比度；梯度；IPACE

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An Improved Phase Adjustment by Contrast EnhancementAlgorithm for Airborne SAR

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Abstract
Phase Adjustment by Contrast Enhancement (PACE) algorithm is a new nonparametric autofocus algorithm, which can extract effectively high frequency phase errors from Synthetic Aperture Radar (SAR) images. PACE algorithm searching the best parameters by optimization method needs much heavy computation load because it takes directly the phase correction vector as variables to be estimated. To reduce the computation load, an improved PACE algorithm is proposed in this paper, which is called Interpolated PACE (IPACE) algorithm. The IPACE takes the contrast function as object function and some variable of the phase correction vector as parameters to be estimated The IPACE algorithm needs much less computation load than the PACE, and the image quality achieved by IPACE is almost the same good as the quality through PACE. The results of focusing the real SAR data show the method is a good robust autofocus algorithm.

Key words SAR Phase Adjustment by Contrast Enhancement (PACE) Autofocus Contrast Gradient IPACE

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