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基于双变量模型和非下采样Contourlet变换的SAR图像相干斑抑制

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SAR Image Despeckling Based on Bivariate Threshold Function in NSCT Domain

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摘要 该文根据非下采样Contourlet分解系数与其父系数之间的相关性，给出非高斯双变量分布模型，应用贝叶斯估值理论推导得到该模型相应的非线性双变量阈值函数。综合SAR图像非对数加性模型和双变量阈值函数，提出基于双变量模型的非下采样Contourlet变换域SAR图像相干斑抑制方法(SNSCTBI)。实验通过对幅度格式和强度格式的SAR图像做相干斑抑制，结果表明了该文算法很好地保持了原始图像的辐射特性，有效抑制了同质区域的相干斑，同时边缘等纹理信息保持清晰。

关键词： SAR图像抑斑   非下采样Contourlet变换   Bayesian估计

Abstract： Considering the dependencies between the coefficients of Contourlet transform and their parents' coefficients, a non-Gaussian bivariate distribution is given, and corresponding nonlinear threshold function is derived from the model using Bayesian estimation theory. Combined nonlogarithmic additive model of SAR image with bivariate threshold function, a novel SAR image despeckling based on bivariate threshold function in Non-Subsampled Contourlet Transform domain (NSCT) is proposed. Experimental results for speckle reduction on amplitude and intensity of SAR images demonstrate that the method holds a good ability of radiometric preservation, the speckle is despeckled well in homogeneous regions, edges and textures of despeckled image are also clear.

Keywords： SAR image despeckling   Non-Subsampled Contourlet Transform (NSCT)   Bayesian estimation

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