

Foucher, S., Farage, G. and G. B. Béné. "Speckle Filtering of PolSAR and PolInSAR Images using Trace-based Partial Differential Equations" In *Proceedings of the 2006 IEEE International Geoscience and Remote Sensing Symposium 2006 and 27th Canadian Symposium on Remote Sensing (IGARSS 2006)*. Colorado Convention Center, Denver, CO, USA, July 31st - August 4, 2006.

Abstract

Partial Differential Equations (PDE) filtering methods provide regularization of an image through successive iterations, where pixel values are gradually diffused in accordance with a local diffusion tensor field. The local diffusion tensor field determines the local smoothing geometry that should drive the regularization process. Most diffusion based filtering methods rely on a divergence formulation for the diffusion term which does not produce an optimal geometry preserving regularization. A new trace-based PDE approach was recently proposed and has been applied to the filtering of color images and other multivalued data. Compared to a classical divergence based formulation approach, a trace based formulation better preserves the geometric content of the image. We propose to apply this framework to the filtering of Polarimetric Interferometric Synthetic Aperture Radar (PolInSAR) images. In particular, the calculation of the local geometry is modified in order to be robust to the speckle noise. Speckle reduction performances are evaluated on both artificial and real PolInSAR images and are compared to other standard speckle reduction filters in terms of radiometric resolution improvement and meaningful details preservation.

Keywords : SAR filtering, speckle, multiscale, contourlet