

A NEW SEGMENTATION METHOD IN SAR IMAGE RECONSTRUCTION

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ABSTRACT. *This paper presents a new segmentation method in synthetic aperture radar (SAR) image reconstruction. The new method achieves segmentation directly from received signal, whereas conventional techniques require preprocessing by pulse compression and corrections afterwards. The advantage of the new method is the simplicity as well as the high performance. Numerical examples demonstrate that the new method indeed gives better segmentation results in image reconstruction. The high performance is valid even in the case contaminated by noise if the noise level is not too high and proper noise reduction technique is applied.*

Keywords: SAR, Image reconstruction, Image segmentation, Noise reduction, Multi-look process

1. **Introduction.** Synthetic aperture radar (SAR) system has been of great use in monitoring the global environment, observing land usage, investigating disaster regions [9, 10, 14, 16] as well as detecting military targets in the early days of the system [3, 11, 18]. One of the important roles of SAR system is to collect the information about the ground surface through image reconstruction. Since the ground surface has diverse areas, such as rice fields, wheat fields, grassland, ponds, asphalt roads, desert, and so forth, those areas have to be segmented in the image reconstruction. Thus segmentation problem arises. Because of the importance, various segmentation methods have been proposed in the framework of image processing. In recent research work, a method based on computing optimal threshold by entropy maximization is derived in [2], the combination of multilevel logistic model and EM algorithm yields an unsupervised segmentation method as proposed in [4], computer-assisted algorithms to segment SAR sea ice imaginary are discussed in [5], oil spill segmentation is considered by using minimum description length and a polynomial active grid in [8], and a segmentation method for sea ice SAR imaginary based on pulse-coupled neural networks is presented in [12]. Furthermore, hybrid segmentation schemes are derived by combining Wishart segmenter and so-called H/A/alpha segmenter in [17],