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Resolution limits in nonlinear microwave image reconstruction

The resolution of microwave imaging methods based on linear radar signal processing such as synthetic aperture radar (SAR) is well known [1] and is directly dependent on the radar signal bandwidth. There are also studies about the resolution of other inverse scattering methods such as diffraction tomography, Born iterative method and distorted Born iterative method [2]. However, to the best of our knowledge, there has been no study on the resolution of optimization based inverse scattering methods. In this presentation, we emphasize on the differences between the optimization based methods and other inverse scattering methods in terms of the resolution. Preliminary observations on the possibility of having very high resolution images using optimization based methods are shown. Also, different natures of the SAR imaging and optimization based imaging are highlighted so that the major difference in the dependability of the resolution on bandwidth in these two methods is justified.

References

[1] M. Soumekh, *Synthetic Aperture Radar Signal Processing with MATLAB Algorithms.* Wiley Interscience, New York, 1999.

[2] T. Cui, W. C. Chew, X. X. Yin and W. Hong, *Study of resolution and super resolution in electromagnetic imaging for half-space problems.* IEEE Trans. Antennas Propagation **52**(2004), 1398–1411.