Abstracts

Tomographic Microwave Diversity Image Reconstruction Employing Unitary Compression

Z. Zhao and N.H. Farhat. "Tomographic Microwave Diversity Image Reconstruction Employing Unitary Compression." 1992 Transactions on Microwave Theory and Techniques 40.2 (Feb. 1992 [T-MTT]): 315-322.

Data compression through a unitary transform is utilized in tomographic microwave diversity image reconstruction in order to reduce the dimensionality and to extract the features in the data space. The unitary compression is derived by minimizing the mean-square error (MSE) and the unitary transform is made of eigenvectors of the data's covariance, regarded to be a Karhunen-Loeve transform. Tomographic microwave frequency-swept imaging was developed using a unique target-derived reference technique to access the three dimensional Fourier space of the scatterer and an image reconstruction algorithm based on the projection slice theorem. It is shown that: centimeter resolution of a complex object can be preserved even when half of the data set is compressed; and that the reconstructed image remains identifiable by a human observer even when 2/3 of the data set is compressed.

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