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Paper Abstract

Name: Michael Y. Jin

Position/Title: Technical Group Supervisor

Affiliation: Jet Propulsion Laboratory, California Institute of Technology
Address: Ms 300/243, Jet Propulsion Laboratory, 4800 oak Grove Dr.,
          Pasadena, CA 91109
Phone Number: (818) 354-3778
Fax Number: (818) 393-6943

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Paper Title: An Efficient Image Recovery Algorithm for Diffraction
              Tomography Systems

Description : A diffraction tomography system has potential application in
ultrasonic medical imaging area. It is capable of achieving imagery with the
ultimate resolution of one quarter the wave length by collecting ultrasonic
backscattering data from a circular array of sensors and reconstructing the object
reflectivity using a digital image recovery algorithm performed by a computer.
One advantage of such a system is that it allows a relatively lower frequency
wave to penetrate more deeply into the object and still achieve imagery with a
reasonable resolution.

An efficient image recovery algorithm for the diffraction
tomography system was originally developed for processing a wide beam
spaceborne SAR data. The algorithm presented here makes use of an exact 2-1)
spectrum of a point target (Jin, 1992) in a range Doppler like processing approach.
It updates its reference functions as frequent as required using a special process -
that generates kernels from which reference functions can be derived efficiently.
Compared to a previously devised algorithm (Norton, 1980), this new algorithm
is about ten to twenty times more efficient since this algorithm makes full use of
the Fast Fourier Transform while the previous one requires the use of a less
efficient quasi-fast Hankel transform.