Abstracts

Electromagnetic Imaging for an Imperfectly Conducting Cylinder

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This paper presents a computational approach to the imaging or inverse scattering of an imperfectly conducting cylinder. A conducting cylinder of unknown shape and conductivity scatters the incident wave in free space and the scattered field is recorded on a circle surrounding the scatterer. By properly processing the scattered data, the shape and conductivity of the scatterer can be reconstructed. The problem is formulated in the form of nonlinear integral equations which can be solved numerically by the Newton-Kantorovitch algorithm. The pseudoinverse technique is used to overcome the ill-posedness, and the condition number of the matrix is also discussed. Numerical examples are given to illustrate the capability of the inversion algorithm using the simulated scattered fields in both near and far zones. Multiple incident directions permit good reconstruction of shape and, to a lesser extent, conductivity in the presence of noise in measured data.

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