Abstracts

Nonlinear inversion in TE scattering

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A method for reconstructing the complex permittivity of a bounded inhomogeneous object from measured scattered-field data is presented. This paper extends the method previously developed for the TM case to the more complicated TE case. In the TM case, the electric-field integral equation involves an integral operator whose integrand was simply a product of the background Green's function, contrast, and field. In the TE case, the magnetic field is polarized along the axis of an inhomogeneous cylinder of arbitrary cross section and the corresponding integral equation contains derivatives of both the background Green's function and the field. The nonlinear inversion based upon the modified-gradient method as presented in the literature is applied to the magnetic-field equation. However, the integral equation can also be formulated as an electric-field integral equation for the two transversal components of the electric field. Again, the integrand is a product of the background Green's function, contrast, and electric-field vector. The derivatives are operative outside the integral. In this paper, the latter formulation will be taken as a point of departure to develop a nonlinear inversion scheme using the modified-gradient method.

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