Abstracts

Two-Dimensional Microwave Imaging by a Numerical Inverse Scattering Solution

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A numerical approach is proposed that aims to detect, by means of interrogating microwaves, the locations and the dielectric permittivities of unknown inhomogeneous dielectric cylindrical objects of arbitrary cross sections that might be present inside a fixed area of interest. We assume an illumination with the electric field vector polarized along the cylindrical axis. The two-dimensional Lippman-Schwinger integral equation of electromagnetic scattering is transformed into matrix form by the moment method. The system obtained is solved by using a pseudoinversion algorithm to overcome ill-conditioning problems. The first-order Born approximation is also applied when the dielectric inhomogeneities are weakly scattering. Computer simulations have been performed by means of a numerical program; results show the capabilities and limitations of the proposed approach.

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