Application of Orthogonality Sampling Method for Identifying Small Anomaly From Scattering Parameters

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ABSTRACT
We consider the application of orthogonality sampling method (OSM) in microwave imaging for a fast localization of small anomalies from measured scattering parameters. For this, we design an indicator function of OSM defined on Lebesgue space to test the orthogonality relation between the Hankel function and the measurement data. This is based on an application of the Born approximation and the integral equation formula for scattering parameters in the presence of a small anomaly. We then examine that the indicator function consists of a combination of an infinite series of Bessel functions of integer order, an antenna configuration, and material properties. Simulation results with synthetic data are presented to show the feasibility and limitations of designed OSM.

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REFERENCES