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Comparison of various CEM methods to predict RCS of lossy dielectrics

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Abstract

The accuracy with which various full-wave and asymptotic CEM techniques can calculate the RCS of lossy dielectric objects is investigated. This is conducted through comparison to measured RCS data. The investigated methods include MLFMM, FEM, PO and RL-GO. Different lossy dielectric materials are used to construct canonical targets. The RCS of these targets are measured in a compact range at the University of Pretoria, South Africa. The material properties of these lossy dielectrics are accurately characterised using a waveguide technique. Accurate CAD models of the dielectric objects are constructed and used for simulations. The calculated RCS results are compared to the measurements to determine the accuracy of the various methods. The performance and computational efficiency of these methods are also investigated.