Abstracts

Improvements to the Finite-Difference Time-Domain Method for Calculating the Radar Cross Section of a Perfectly Conducting Target

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The finite-difference time-domain (FDTD) method has used extensively to calculate scattering and absorption from both dielectric objects and perfectly conducting objects. Several improvements the FDTD method for calculating the radar cross section (RCS) perfectly conducting target are presented in this paper. Sinusoidal pulsed FDTD excitations are compared to determine an efficient method of finding the frequency response of targets. The maximum cell size, minimum number of external cells, and a new method to eliminate storage in the shielded internal volume of perfect conductors to reduce the computer storage requirements of FDTD are discussed. The magnetic field dc offset induced by surface currents on perfectly conductive objects is observed and its effects removed by postprocessing to achieve convergence of RCS calculations. RCS calculations using the method in two dimensions are presented for both square and circular infinite cylinders illuminated by both TE and TM polarized plane The RCS of a metal cube in three dimensions is also presented. agreement between FDTD calculations and theoretical values is achieved for all cases, and parameters necessary to achieve this agreement examined.

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