西安电子科技大学学报 2007 34 (7): 132-135 ISSN: 1001-2400 CN: 61-1076/TN

三维复杂目标电磁散射的FDFD分析

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收稿日期 修回日期 网络版发布日期 2007-9-20 接受日期

摘要 根据Yee元胞中电场分量的分布特点，对矢量Helmholtz方程进行差分离散，得到关于各电场节点的FDFD方程式。基于等效原理，在总场－散射场（TF/SF）边界处设置等效电磁流，通过将TF/SF边界附近各电场节点FDFD方程式中的相关节点加上或减去相应的入射场，将平面波引入总场区。导体立方体表面电流幅值与相位分布的计算结果与文献结果的比较验证了该方法的正确性。

关键词 频域有限差分（FDFD）方法 电磁散射 复杂目标 TF/SF方法

分类号 TN011

3D FDFD analysis of electromagnetic scattering from a complex target

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Abstract

The finite-difference frequency-domain (FDFD) equations of electronic field nodes are derived by differentiating the Helmholtz equation, based on the distribution of electric field nodes in Yee cells. Based on the equivalence principle, the incident wave is introduced in the total-field region by setting equivalent electromagnetic currents on the total-field/scattered-field (TF/SF) boundary. The FDFD equations of the nodes located near the TF/SF boundary are modified to fulfill the conditions that all nodes involved belong either to the total-field or to the scattered-field. The method is validated by comparing the amplitude and phase of the surface current on a perfectly electronic conductor cube, which are calculated by the FDFD method, with the result presented in the literature.

Key words FDFD method electromagnetic scattering complex targets TF/SF technique

DOI:

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