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三角面元数据模型FDTD网格生成技术

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摘要 提出了一种将描述目标表面形状的三角面元数据转换为时域有限差分(FDTD)目标几何模型的投影求交方法，根据目标的介质信息得到相应位置Yee元胞的电磁参数，得到目标的FDTD电磁模型．给出了典型目标金属球和圆柱的FDTD网格模型，计算得到的雷达散射截面(RCS)结果与其他方法符合很好．另外，还根据某导弹的三角面元数据给出了它的FDTD模型，并计算其后向RCS．结果表明，该方法可应用于复杂目标的FDTD计算建模．

关键词 三角面元模型 时域有限差分建模 时域有限差分方法

分类号 TN011

A novel FDTD modeling technique based on triangle mesh-units of an object

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Abstract

A novel technique converting triangle mesh data to Yee's cell is proposed for finite-difference time-domain(FDTD) computation. In a rectangular coordinate system, based on the model of triangle mesh-units of a target, its FDTD geometry model is obtained by using the projection and cross-point method. At the same time, by recording the electromagnetic parameter of the Yee-cell, the FDTD electromagnetic model is given. In this paper, the typical objects as a perfectly conducting (PEC) sphere and a PEC column are modeled with the aid of this novel technique, and their Radar Scattering Sectior(RCS) are calculated by using the FDTD method. The computational results agree with those by the other numerical methods. Finally, the FDTD model of one missile is presented using the novel technique, and its backscattering RCS is calculated by using the FDTD method. Results show that this novel technique is applicable, in particular, to the FDTD computation for complex objects.

Key words triangle face-units finite-difference time-domain modeling finite-difference time-domain method

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