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基于三角面元的涂层目标FDTD共形网格生成技术

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摘要：

提出了一种基于三角面元数据生成涂层目标时域有限差分（finite-difference time domain， FDTD）共形网格的方法。通过将原目标中各三角面元的顶点沿曲面在该点处的法线方向内移（内涂层）或外移（外涂层）所需的厚度，得到一组关于涂层的三角面元数据。其中曲面上各顶点处的法线方向近似等于包围该顶点的各三角面元的单位法向的矢量和。对于局部涂敷的情况，可根据需要只将涂敷部分所包含的三角面元顶点进行相应的移动，而其余顶点的位置保持不变。利用投影求交法，由原目标的三角面元数据和新生成的涂层三角面元数据即可得到共形FDTD计算所需要的共形网格参数。数值结果验证了方法的正确性和有效性。

关键词： 时域有限差分 三角面元 共形网格 涂层目标 局部涂敷

Conformal FDTD mesh-generating scheme for coated targets based on triangle-patch

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Abstract:

A conformal finite-difference time domain (FDTD) mesh-generating scheme for coated targets based on the triangle-patch is presented. For every vertex, the triangle-patches which have a common vertex should be figured out, and all the unit external normal vectors of these triangle-patches are directly summed up. The vector summation can be approximately seen as an external “average normal vector” of the common vertex. A data file about the coordinates of vertexes on coating can be got by removing the vertexes with a distance of coating thickness along their normal line, respectively. If a target is “internal coated”, then vertexes should be removed along the positive direction of normal; else if it is “externally coated”, then vertexes should be removed along the negative direction of normal. When a target is partially coated, only the vertexes on the coating part need to be removed, and the other vertexes remain unchanged. The triangle-patches data files about the original target and coating are used to generate FDTD conformal meshes for coated targets. The numerical results validate this scheme.

Keywords: finite-difference time domain (FDTD) triangle-patch conformal mesh coated target partially coated

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1. 魏兵，葛德彪，王飞，龚书喜.微波段电单轴介质主轴方向确定及参数反演[J]. 系统工程与电子技术，2010,32(10): 2116-2120
2. 况晓静，吴先良，黄志祥，陈明生.基于时域有限差分方法求解薛定谔方程[J]. 系统工程与电子技术，2010,32(10): 2121-2123