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基于CRE和MPI的腔体RCS快速并行计算

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摘要 根据波前Q矩阵的定义点总位于波束轴上极值点的特点，提出了三维复射线近轴近似相位校正因子计算公式．该公式不用考虑主方向和主曲率的计算和坐标旋转，直接计算相位校正因子，从而简化了复射线展开法(CRE)的近轴近似计算．在此基础上提出了按RCS计算角度间隔分配计算任务的大粒度计算并行计算方法．计算结果显示电大尺寸开口腔体的RCS计算速度相对于传统的射线弹跳法提高了两个量级．

关键词 电大尺寸开口腔体 复射线展开 并行计算

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Fast parallel calculation of the radar cross section for large open-ended cavities based on CRE and MPI

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Abstract

<P><FONT face=Verdana>According to the characteristic that the definition point of the Q matrix of wave front is always located on the extremum point on the axis of the beam, a three-dimensional formula for the rectificative factor of phase in complex ray paraxial approximation is proposed, which calculates the rectificative factor of phase directly without considering the calculation of the main directions and curvatures and the rotation of the coordinates, thus simplifying the paraxial approximation calculation by the complex ray expansion (CRE) method. A big cell parallel calculating method is proposed, by which the calculation tasks are distributed to the processes，evenly spaced，according to RCS calculating angles. Results show that the calculating speed of the Large Open-ended Cavities' RCS is about 102 higher than that of the traditional shooting and bouncing ray (SBR).
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Key words large open cavities complex ray expansion parallel calculation

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