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论文

基于矢量波函数空间算子理论的波导系统有限元分析

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摘要
该文介绍了一种能够消除非物理模的波导系统的有限元分析方法，从矢量波函数空间的偏微分算子理论出发，推导出具有简洁而自洽数学形式的完备的电磁波基本方程组，将电场矢量用两个标量函数表示，并用有限元法对这两个标量函数进行数值求解，从而得到了波导系统的有关参数，文中以加载膜片波导和E面矩形波导阶梯为例说明了这一分析及计算过程。

关键词 电磁波基本方程组 波导 有限元法

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Finite element analysis of the waveguide system based on the operator theory of vector wave function space

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Abstract
This paper presents a finite element method for the analysis of waveguide system without spurious modes. Prom the operator theory of the vector wave function space, a succinct and complete electromagnetic wave equation set is derived and the electiic field intensity vector can be expressed by two scalar functions. These two scalar functions are numerically computed by using finite element method so that the parameters of the waveguide system can be obtained. The method is demonstrated by the calculation of the reflection coefficients of the rectangular waveguide with an inductive diaphragm and the rectangular waveguide with an E-plane step respectively.

Key words Basic electromagnetic wave equation set Waveguide Finite element method

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