Abstracts

An Implementation of the Vectorial Finite Element Analysis of Anisotropic Waveguides through a General-Purpose PDE Software

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This paper reports on the major progress in the development of an intelligent, interactive and automated system, based on the vector finite element method, and implemented within PDE/Protran problem solving environment. The system is known as WAVEGIDE and was originally developed by the authors for an efficient solution of inhomogeneous dielectric waveguides. In this paper, it has been further extended to the solution of anisotropic waveguiding structures. With our system, through an interactive "question-and-answer" session, which requires minimal knowledge of programming, the problem can be defined using high level PDE/Protran commands. It can then be simply and quickly solved by the main processor within this intelligent environment. To verify the convergence and accuracy of the present approach, numerical results (with respect to the grid density and element order) for a rectangular metallic waveguide half filled with dielectric are given and compared with other finite element methods. Numerical results for an anisotropic dielectric rectangular waveguide are also presented. These results clearly illustrate the accuracy and the ease of use of the modified WAVEGIDE program.

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