ABSTRACT

This dissertation develops a formalism to analyze the propagation of waves in open dielectric waveguides, using: Vectorial Magnetic Method and Finite Element Method.The domain of open waveguides is infinite.The application of perfectly matched absorbing boundaries (PML − *Perfectly Matched Layer*) adapts the external region to a finite, computationally tractable domain.In the developed analysis, the PML's were implemented in a Fortran program to simulate the propagation of electromagnetic waves in dielectric anisotropic structures. That program was formulated by: Vectorial Magnetic Method and Finite-Element Method, with very satisfying results.In order to validate the method, the rectangular anisotropic, embedded, and ARROW (*AntiRessonant Reflecting Optical Waveguide*) waveguides were studied. The confrontation with the results from literature was satisfying.

Keywords: Finite Element Method;Absorbing boundary conditions; PML; Dielectric waveguide.