

## ABSTRACT

SILVA, E. S. *Application of PML absorbing boundary conditions to the analysis of dielectric structures by the finite-element method.* 2017. 219f. Dissertação (Mestrado em Engenharia Eletrônica) - Faculdade de Engenharia, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, 2017.

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 (*AntiResonant 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.