

CHAPTER 57

TECHNOLOGY
ELECTRONICS AND COMMUNICATION
ENGINEERING

Doctoral Theses

621. VAISH (Arti)
Effects of anisotropic, Inhomogeneous Permittivity and Gravitation on Electromagnetic Wave Propagation in Waveguides.
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Abstract

Deals with the 'Effects of anisotropic, inhomogeneous permittivity and gravitation on electromagnetic wave propagation in waveguides'. Waveguide is a structure which can guide electromagnetic energy. Transportation of electromagnetic energy is one of the prime needs of a communication system. Communication engineers are in constant search of structures which can transport electromagnetic energy over long distances with minimum possible loss. Metallic waveguide can transport the electromagnetic energy efficiently over frequencies ranging between few tens of kHz to few tens of GHz. A frequency increases further to optical spectrum, losses becomes dominant and need of dielectric waveguide arises. Dielectric waveguides are the waveguide with some dielectric layers or dielectric constant. In the present work we will study the effects of anisotropic, inhomogeneous permittivity and gravitation on electromagnetic wave propagation in waveguides.

Contents

1. Introduction. 2. Modal analysis of waveguide using method of moments. 3. Wave propagation in waveguide having anisotropic permittivity. 4. A novel system of two coupled equations for the longitudinal components of the electromagnetic field in a waveguide. 5. Frequencies of propagation of electromagnetic waves in a hexagonal waveguide. 6. Finite element analysis of a waveguide : Effect of gravitational field. 7. Maxwell's equation in a waveguide : Effect of gravitational field. 8. Conclusion and bibliography.