
**ELECTROMAGNETIC
WAVES** **PIER 13**

**Progress
In
Electromagnetics
Research**

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This publication is printed on acid-free paper.

ISSN 1070-4698

Manufactured in the United States of America

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Chief Editor: J. A. Kong

Electromagnetic Theory
and Network Methods

Editors:
M. Tateiba and L. Tsang

EMW Publishing
Cambridge, Massachusetts, USA

ELECTROMAGNETIC THEORY AND NETWORK METHODS

PREFACE

The development of millimeter and optical wave technologies requires new techniques in electromagnetic theory. This volume of PIER 13 is devoted to the description of seven techniques developed recently by Japanese and Chinese researchers. The techniques can be separated into analytic and numerical ones and are useful for scattering, propagation, and transmission problems.

The chapter by Hayashi provides a necessary and sufficient condition for electromagnetic (EM) wave scattering by open boundaries of any shape. The chapter by Lu studies the propagation of short radio waves in the ionosphere. The theory of gliding mode is introduced to account for ionospheric refraction to achieve long distance propagation. The chapter by Hashimoto addresses the recent development of stationary optics based on wave-normal rays different from energy rays in Hamilton's dynamical optics. The chapter by Yin et al. studies hybrid modes in chirowaveguides. In the chapter by Ikuno et al., a uniform asymptotic method applicable to the analysis of propagation characteristics of graded-index optical fibers is described. In the chapter by Shigesawa and Tsuji, an equivalent network method is used for analyzing dielectric waveguides with discontinuities such as a Y branch and corrugations of finite length. The chapter by Yoshida et al. develops the spatial network method for the three-dimensional time-dependent analysis of EM waves in anisotropic media with dispersive characteristics.

March 1996

M. Tateiba and L. Tsang

CONTENTS

Chapter 1	ELECTROMAGNETIC THEORY BASED ON INTEGRAL REPRESENTATION OF FIELDS AND ANALYSIS OF SCATTERING BY OPEN BOUNDARY Y. Hayashi	
	1. Introduction	3
	2. Field Equations and Related Subjects	7
	3. Integral Representation Formulas of Electromagnetic Fields (Case of a Closed Boundary	23
	4. Integral Representation Formulas of Electromagnetic Fields (Case of an Open Boundary	34
	5. Analysis of Electromagnetic Scattering by an Open Boundary	40
	6. Theorems, Proofs and Comments	53
	References	84
Chapter 2	A UNIFIED THEORY OF IONOSPHERIC PROPAGATION OF SHORT RADIO WAVES WITH SPECIAL EMPHASIS ON LONG-DISTANCE PROPAGATION B. W. Lu	
	1. Introduction	87
	2. Solution by the Ray Treatment	88
	3. Solution by Full-Wave Treatment	103
	4. Conclusions and Discussion	113
	References	114
Chapter 3	GEOMETRICAL OPTICS OF GUIDED WAVES IN WAVEGUIDES M. Hashimoto	
	1. Introduction	115
	2. Historical Note	117
	3. Variational Principles	118

	4. Ray Tracing of Wave-Normal Rays and Wavefronts	125
	5. Tracing of Ray Fields Along Wave-Normal Rays	127
	6. Total Reflection of Wave-Normal Rays upon a Dielectric Interface	128
	7. Applications to Guided Wave Problems	133
	8. Summary	139
	Appendix	141
	References	141
Chapter 4	HYBRID MODE CHARACTERISTICS IN MULTILAYERED FARADAY CHIROWAVEGUIDES W. Yin, W. Wan, and W. Wang	
	1. Introduction	149
	2. The Field Expression of the Problem	150
	3. Dispersion Equation of the Hybrid Modes	156
	4. The Effects of Constitutive Parameters	159
	5. Conclusion	164
	Appendices	165
	References	167
Chapter 5	UNIFORM ASYMPTOTIC ANALYSIS OF GUIDED MODES OF GRADED-INDEX OPTICAL FIBERS WITH EVEN POLYNOMIAL PROFILE CENTER CORES H. Ikuno, S. Mori, and A. Yata	
	1. Introduction	169
	2. Electromagnetic Fields of the Guided Modes	172
	3. Formal Perturbed Solution of the Vector Wave Equation	174
	4. Uniform Asymptotic Solution of the Scalar Wave Equation	188
	5. Uniform Asymptotic Solution of the Vector Wave Equation	200
	6. Characteristic Equations for the Guided Modes	214
	7. Accuracy Checks of the Uniform Asymptotic Solutions	220

8.	Optimization of Parameters of a Dispersion-Shifted Optical Fiber with an Even Polynomial Refractive-Index Center Core	230
9.	Conclusions	234
	Appendices	235
	References	237
Chapter 6	A NEW EQUIVALENT NETWORK APPROACH TO ELECTROMAGNETIC WAVE PROBLEMS H. Shigesawa and M. Tsuji	
1.	Introduction	243
2.	General Approach	246
3.	Discontinuous Waveguide Structures	257
4.	Electromagnetic-Wave Scattering and Diffraction	278
5.	Concluding Remarks	284
	Appendices	285
	References	288
Chapter 7	FORMULATION OF ANISOTROPIC MEDIUM IN SPATIAL NETWORK METHOD N. Yoshida, S. Koike, N. Kukutsu, and T. Kashiwa	
1.	Introduction	293
2.	Spatial Network for 3-D Maxwell's Equation	295
3.	Uniaxial Anisotropy	304
4.	Magnetized Ferrite	322
5.	Magnetized Plasma	340
6.	Conclusion	359
	References	360