
**ELECTROMAGNETIC
WAVES** **PIER 17**

**Progress
In
Electromagnetics
Research**

All rights reserved.

No part of this publication may be reproduced.

Request for permission should be addressed to the Publisher.

Copyright © 1997 EMW Publishing

All inquiries regarding copyrighted material from this publication, manuscript submission instructions, and subscription orders and price information should be directed to: EMW Publishing, P. O. Box 597, Kendall Square, Cambridge, Massachusetts 02142-0597, USA. For up-to-date information, visit web site at <http://www.emwave.com>

This publication is printed on acid-free paper.

ISSN 1070-4698

Manufactured in the United States of America

ELECTROMAGNETIC WAVES

PIER 17

Progress
In
Electromagnetics
Research

Chief Editor: J. A. Kong

EMW Publishing
Cambridge, Massachusetts, USA

CONTENTS

Chapter 1	AN R.F. SENSOR FOR LOGGING-WHILE-DRILLING GEOPHYSICAL MEASUREMENTS <i>T. M. de Swiet</i>	
1.	Introduction	1
2.	Theory	3
3.	Antenna Optimization	10
4.	Conclusion	21
	Acknowledgments	22
	Appendix A	22
	Appendix B	23
	References	24
Chapter 2	HYBRIDIZATION OF SBR AND MoM FOR SCATTERING BY LARGE BODIES WITH INHOMOGENEOUS PROTRUSIONS <i>F. Ling and J.-M. Jin</i>	
1.	Introduction	25
2.	Formulation	27
3.	Iterative Improvement	34
4.	Numerical Results	35
5.	Conclusion	42
	Acknowledgments	42
	References	42
Chapter 3	BARGMAN TRANSFORMS AND PHASE SPACE FILTERS <i>H. N. Kritikos, J. H. Cho, and J. G. Teti, Jr.</i>	
1.	Introduction	45
2.	The Harmonic Oscillator	47
3.	The Phase Space Transform	49
4.	The Bargman Transform	51
5.	Hermite Function Expansions of Common Signals	55
6.	Elliptical Filters	57
7.	Applications	59
8.	Discussion of Results	63

	Appendices	67
	References	70
Chapter 4	ANALYSIS OF SIGNAL DISTORTION ON COUPLED MICROSTRIP LINES WITH AN OVERLAY AND A NOTCH <i>M. El-Shenawee and A. Z. Elsherbeni</i>	
	1. Introduction	73
	2. Formulation of the Problem	74
	3. Numerical Results	78
	4. Conclusion	88
	Acknowledgment	88
	References	89
Chapter 5	THE DISCRETIZED MIE-FORMALISM FOR ELECTROMAGNETIC SCATTERING <i>T. Rother and K. Schmidt</i>	
	1. Theoretical Review	92
	2. Formulation of the Scattering Problem	94
	3. The Method of Lines	100
	4. Derivation of the Characteristic Equation System	117
	5. Definition of Scattering Parameters	146
	6. Applications	160
	7. Conclusion	177
	References	178
Chapter 6	HIGH-FREQUENCY SWITCHING AND KERR EFFECT ---NONLINEAR PROBLEMS SOLVED WITH NONSTATIONARY TIME DOMAIN TECHNIQUES <i>I. Åberg</i>	
	1. Introduction	185
	2. The Method of Solution	188
	3. Two Nonlinear Wave Propagation Problems	197
	4. Summary	230
	Acknowledgments	230
	Appendix	231
	References	233

Chapter 7	A MULTISCALE MOMENT METHOD FOR SOLVING FREDHOLM INTEGRAL EQUATION OF THE FIRST KIND <i>C. Su and T. K. Sarkar</i>	
1.	Introduction	237
2.	Formula for Basis Functions Based on Multiscaling Technique	239
3.	A Multiscale Moment Method for Solving Integral Equation	244
4.	Adaptive Algorithm of Multiscale Moment Method	250
5.	Numerical Simulations	252
6.	Discussion	262
	References	263
Chapter 8	PERMITTIVITY PROFILE RECONSTRUCTIONS USING TRANSIENT ELECTROMAGNETIC REFLECTION DATA <i>P. Fuks, G. Kristensson, and G. Larson</i>	
1.	Introduction	266
2.	Theory	267
3.	General Considerations	280
4.	Deconvolution	282
5.	Experimental Set-up	285
6.	Analysis of Errors	288
7.	Results	293
	References	302
Chapter 9	AN EFFECTIVE HYBRID METHOD FOR ELECTRO-MAGNETIC SCATTERING FROM INHOMOGENEOUS OBJECTS <i>Z. Xiang and Y. Lu</i>	
1.	Introduction	305
2.	Formulation	307
3.	Numerical Results	313
4.	Conclusion	319
	References	320

Chapter 10 LEAKY FIELDS ON MICROSTRIP

*L. O. McMillan, N. V. Shuley, and
P. W. Davis*

1.	Introduction	323
2.	Formulation	324
3.	Dispersion Characteristic	326
4.	Paths of Integration	327
5.	Fields	329
6.	Results	330
7.	Conclusion	331
	References	337