
**ELECTROMAGNETIC
WAVES** **PIER 91**

Progress

In

Electromagnetics

Research

© 2009 EMW Publishing. All rights reserved.

No part of this publication may be reproduced. Request for permission should be addressed to the Publisher.

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 425517, Kendall Square, Cambridge, Massachusetts 02142, USA.

ISSN 1070-4698

E-ISSN 1559-8985

**ELECTROMAGNETIC
WAVES** **PIER 91**

Progress

In

Electromagnetics

Research

Chief Editor: Weng Cho Chew

EMW Publishing

Cambridge, Massachusetts, USA

CONTENTS

THE APPLICATION OF RAY-TRACING TO MOBILE LOCALIZATION USING THE DIRECTION OF ARRIVAL AND RECEIVED SIGNAL STRENGTH IN MULTIPATH INDOOR ENVIRONMENTS

A. Tayebi, J. Gomez, F. Saez de Adana, and O. Gutierrez

1	Introduction	1
2	The Ray-tracing Model	3
3	The Fingerprinting Technique	5
4	Experimental Results	7
5	Conclusions	12

NUMERICAL MODELING AND MECHANISM ANALYSIS OF VHF WAVE PROPAGATION IN FORESTED ENVIRONMENTS USING THE EQUIVALENT SLAB MODEL

Y. Li and H. Ling

1	Introduction	17
2	Sommerfeld Solution and Numerical Implementation	19
3	Analysis of Propagation Mechanisms in the Forest	23
4	Extraction of Effective Forest Parameters Based on the Slab Model	28
5	Conclusions	31

NUMERICAL CHARACTERIZATION OF BISTATIC SCATTERING FROM PEC CYLINDER PARTIALLY EMBEDDED IN A DIELECTRIC ROUGH SURFACE INTERFACE: HORIZONTAL POLARIZATION

X. Wang and L.-W. Li

1	Introduction	36
2	Problem Formulation	38
3	Numerical Results	42
4	Conclusions	48

MODELLING AN IRONLESS LOUDSPEAKER BY USING THREE-DIMENSIONAL ANALYTICAL APPROACHES

R. Ravaut and G. Lemarquand

1	Introduction	53
2	Modelling Tile Permanent Magnets with the Coulombian Model	54
3	Three-dimensional Expressions of the Magnetic Field Components Created by a Tile Permanent Magnet Uniformly Magnetized	56
4	Assembly of Tile Permanent Magnets Uniformly Magnetized for Creating a Ring Permanent Magnet	61
5	Illustration: Design of an Ironless Loudspeaker Structure	63
6	Conclusion	66

ON THE HYBRID FIELD PATTERNS OF HELICAL CLAD DIELECTRIC OPTICAL FIBERS

A. H. B. M. Safie and P. K. Choudhury

1	Introduction	69
2	Analytical Treatment	71
3	Results and Discussion	75
4	Conclusion	81

1 × 2 Y-BRANCH PLASTIC OPTICAL FIBER WAVEGUIDE COUPLER FOR OPTICAL ACCESS -CARD SYSTEM

A. A. Ehsan, S. Shaari, and M. K. A. Rahman

1	Introduction	86
2	System Overview	87
3	Device Design	88
4	Non Sequential Ray Tracing	91
5	Device Fabrication and Measurement	96
6	Conclusions	99

A NEW METRIC TO ANALYZE PROPAGATION MODELS

*J. Blas, R. M. Lorenzo, P. Fernández, E. J. Abril, A. Bahillo
S. Mazuelas and D. Bullido*

1	Introduction	102
2	Propagation Model Contextualization	103
3	Statistical Distribution Variations	106

4	Sub-aperture Number and Source Intensity Maps	108
5	Influence of Room Geometrical Description	111
6	Conclusions	117

**AN ACCURATE COMPLEX PERMITTIVITY METHOD
FOR THIN DIELECTRIC MATERIALS**

U. C. Hasar and O. Simsek

1	Introduction	123
2	Dielectric Constant Theory Development	126
3	Complex Permittivity Determination	127
4	Computations for Assessing The Accuracy	130
5	Measurement Results	131
6	Conclusion	136

**A SIMPLE APPROACH FOR EVALUATING THE
RECIPROCIITY OF MATERIALS WITHOUT USING
ANY CALIBRATION STANDARD**

U. C. Hasar and O. Simsek

1	Introduction	139
2	Model for the Problem	141
3	A Metric Function for Evaluation of the Reciprocity	144
4	Experimental Results	145
5	Conclusion	149

**A FAST APPROACH FOR SIMULATING LONG-TIME
RESPONSE OF HIGH-SPEED DISPERSIVE AND LOSSY
INTERCONNECTS TERMINATED WITH NONLINEAR
LOADS**

C.-N. Chiu and I-T. Chiang

1	Introduction	153
2	Formulation	155
3	Results and Discussion	158
4	Conclusion	166
	Appendix A.	167

**INSAR HEIGHT INVERSION BY USING 3-D PHASE
PROJECTION WITH MULTIPLE BASELINES**

B.-I. Wu, M. Yeung, Y. Hara, and J. A. Kong

1	Introduction	173
2	2-D Projection Method	174
3	3-D Projection Method	182
4	3-D Phase Projection for a Cartwheel Configuration of Satellites	186
5	Conclusion	191

**A METALLIC RFID TAG DESIGN FOR STEEL-BAR
AND WIRE-ROD MANAGEMENT APPLICATION IN
THE STEEL INDUSTRY**

S.-L. Chen, S.-K. Kuo, and C.-T. Lin

1	Introduction	195
2	Metallic RFID Tag Antenna Design	197
3	Practical Design and Implemented	205
4	Conclusion	210

**NOVEL COMPACT “VIA-LESS” ULTRA-WIDE BAND
FILTER UTILIZING CAPACITIVE MICROSTRIP PATCH**

M. S. Razalli, A. Ismail, M. Adzir Mahdi, and M. N. Hamidon

1	Introduction	214
2	Theory and Simulation	215
3	Fabrication and Measurement	223
4	Conclusion	225

**DEVELOPMENT AND ELECTROMAGNETIC
CHARACTERIZATION OF ADAPTABLE
OPEN-ARCHITECTURE WLAN SYSTEMS**

V. P. Papantoniou and T. D. Xenos

1	Introduction	230
2	Description of the New Wireless Systems	231
3	The 3D Wide Angle PE-FD Method	232
4	Computational Results	234
5	Conclusion	239

**STUDY ON THE DEMODULATION STRUCTURE
OF READER RECEIVER IN A PASSIVE RFID
ENVIRONMENT**

J.-H. Bae, W. Choi, J. Kim, G.-Y. Choi, and J.-S. Chae

1	Introduction	243
2	Problem Formulation	244
3	Demodulation Algorithm	248
4	Simulation Results	250
5	Conclusion	256

**TWI EXPERIMENTAL RESULTS BY A LINEAR
INVERSE SCATTERING APPROACH**

R. Solimene, A. Brancaccio, R. Pierri, and F. Soldovieri

1	Introduction	259
2	Scattering Configuration and Imaging Algorithm	260
3	Radar System	263
4	Experimental Results	264
5	Conclusions	270

**DOUBLE-RIDGED ANTENNA FOR WIDEBAND
APPLICATIONS**

A. R. Mallahzadeh and A. Imani

1	Introduction	273
2	Description of the Antenna Configuration	274
3	Results and Discussion	280
4	Parametric Studies and Discussion	281
5	Conclusion	283

**MUTUAL INDUCTANCE CALCULATION FOR
NON-COAXIAL CIRCULAR AIR COILS WITH
PARALLEL AXES**

C. Akyel, S. I. Babic, and M.-M. Mahmoudi

1	Introduction	287
2	Basic Expressions	289
3	Calculation Method	290
4	Examples	293
5	Conclusion	298

**CERAMIC PROCESSING ROUTE AND
CHARACTERIZATION OF A Ni-Zn FERRITE FOR
APPLICATION IN A PULSED-CURRENT MONITOR**

V. L. O. Brito, A. C. C. Migliano, L. V. Lemos, and F. C. L. Melo

1	Introduction	304
2	Experimental Procedure	306
3	Results and Discussion	308
4	Conclusion	316

**MODIFIED PLANE WAVE METHOD ANALYSIS OF
DIELECTRIC PLASMA PHOTONIC CRYSTAL**

L. Qi and Z. Yang

1	Introduction	319
2	Theoretical Model and Modified Plane Wave Method	320
3	Results and Discussions	323
4	Conclusions	330

**PROPAGATION FEATURES OF H-GUIDES WITH
BIANISOTROPIC SPLIT RING RESONATOR
METAMATERIALS**

X. Yang, Y. Xie, R. Yang, and R. Wang

1	Introduction	333
2	Full Wave Analysis of H-guide with Bianisotropic SRR Metamaterials	334
3	Slow Wave Propagation and Enhanced Energy Flow	338
4	Abnormal Guidance and Leakage Suppression of Higher- Order Modes	342
5	Conclusion	345

**MULTILAYER SYSTEM OF LORENTZ/DRUDE TYPE
METAMATERIALS WITH DIELECTRIC SLABS AND
ITS APPLICATION TO ELECTROMAGNETIC FILTERS**

C. Sabah and S. Uckun

1	Introduction	349
2	Theoretical Analysis	350
3	Numerical Results	353
4	Summary and Conclusion	359

**DIAGNOSIS OF ARTICULAR CARTILAGE DAMAGE
BY POLARIZATION SENSITIVE OPTICAL
COHERENCE TOMOGRAPHY AND THE EXTRACTED
OPTICAL PROPERTIES**

*J.-J. Shyu, C.-H. Chan, M.-W. Hsiung, P.-N. Yang, H.-W. Chen
and W.-C. Kuo*

1	Introduction	365
2	Materials and Methods	366
3	Results	368
4	Discussion	371
5	Conclusion	374

**ON THE APPLICATION OF MICROWAVE
CALIBRATION-INDEPENDENT MEASUREMENTS
FOR NONINVASIVE THICKNESS EVALUATION OF
MEDIUM- OR LOW-LOSS SOLID MATERIALS**

U. C. Hasar and O. Simsek

1	Introduction	378
2	The Method	379
3	Measurements	384
4	Conclusions	389

**AN UNEQUAL DUAL-FREQUENCY WILKINSON
POWER DIVIDER WITH OPTIONAL ISOLATION
STRUCTURE**

Y. Wu, Y. Liu, and S. Li

1	Introduction	393
2	Theory and Design Equations	395
3	Simulations and Experiments	402
4	Conclusion	407
	Appendix A.	408