



IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

A PUBLICATION OF THE IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY



OCTOBER 1995

VOLUME 43

NUMBER 10

IETMAB

(ISSN 0018-9480)

PAPERS

- FDTD Analysis of High Frequency Electronic Interconnection Effects *P. C. Cherry and M. F. Iskander* 2445
- Efficient Finite Element Analysis of Waveguides with Lossy Inhomogeneous Anisotropic Materials Characterized by
Arbitrary Permittivity and Permeability Tensors *L. Valor and J. Zapata* 2452
- Analysis of Curved and Angled Surfaces on a Cartesian Mesh Using a Novel Finite-Difference Time-Domain Algorithm
..... *I. J. Craddock and C. J. Railton* 2460
- Analysis of Lossy Planar Transmission Lines by Using a Vector Finite Element Method.....
..... *M. S. Alam, M. Koshiba, K. Hirayama, and Y. Hayashi* 2466
- A Unified TLM Model for Wave Propagation of Electrical and Optical Structures Considering Permittivity and
Permeability Tensors *J. Huang and K. Wu* 2472
- Considerations and Simulations of Subfrequency Excitation of Series Integrated Resonant Tunneling Diodes Oscillator
..... *R. Sun, O. Boric-Lubecke, D.-S. Pan, and T. Itoh* 2478
- Wave Spreading Evaluation of Interconnect Systems *H. Liao and W. W.-M. Dai* 2486
-

SHORT PAPERS

- Analysis of Planar Structures by an Integral Approach Using Entire Domain Trial Functions
..... *M. Nadarassin, H. Aubert, and H. Baudrand* 2492
- On the Utilization of Periodic Wavelet Expansions in the Moment Methods *G. Wang* 2495
- Analytical Expressions for Simplifying the Design of Broadband Low Noise Microwave Transistor Amplifiers
..... *G. N. Link and V. S. R. Gudimetla* 2498
- Simple and Explicit Formulas for the Design and Analysis of Asymmetrical V-Shaped Microshield Line
..... *K.-K. M. Cheng and I. D. Robertson* 2501
- Nonlinear Yield Analysis and Optimization of Monolithic Microwave Integrated Circuits.....
..... *S. D'Agostino and C. Paoloni* 2504
- 28 GHz Omni-Directional Quasi-Optical Transmitter Array *M. J. Vaughan and R. C. Compton* 2507
- Finite-Difference Time-Domain Analysis of Microwave Circuit Devices on High Performance Vector/Parallel Computers
..... *S. D. Gedney* 2510
- Scattering from a Circular Dielectric Post Embedded in a Grounded Dielectric Sheet Waveguide
..... *E. Sawado, K. Ishibashi, and K. Hatakeyama* 2514
-



IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY

The Microwave Theory and Techniques Society is an organization, within the framework of the IEEE, of members with principal professional interests in the field of microwave theory and techniques. All members of the IEEE are eligible for membership in the Society and will receive this TRANSACTIONS upon payment of the annual Society membership fee of \$28.00. For information on joining, write to the IEEE at the address below. *Member copies of Transactions/Journals are for personal use only*

ADMINISTRATIVE COMMITTEE

E. D. COHEN, <i>President</i>	M. A. MAURY, JR., <i>Vice President</i>	R. W. BIERIG, <i>Secretary</i>	D. G. SWANSON, <i>Treasurer</i>
J. T. BARR	M. GOLIO	T. KEMERLEY	M. SCHINDLER
R. E. BRYAN	D. HORNBuckle	R. POLLARD	R. SUDBURY
S. J. FIEDZIUSZKO	R. H. JANSEN	E. A. REZEK	G. THOREN
			J. W. WASSEL
			D. WEBB
			E. YAMASHITA

Honorary Life Members

A. C. BECK	T. S. SAAD
S. B. COHN	K. TOMIYASU
T. ITOH	L. YOUNG
A. A. OLINER	

Distinguished Lecturers

W. CURTICE	V. RIZZOLI
P. GOLDSMITH	J. R. WHINNERY
F. IVANEK	

Past Presidents

E. J. CRESCENZI (1994)
P. W. STAECKER (1993)
R. S. KAGIWADA (1992)

S-MTT Chapter Chairmen

Albuquerque: D. T. MCGRATH	Hungary: I. FRIGYES	Santa Clara Valley/San Francisco: S. CRIPPS
Atlanta: A. F. PETERSON	Huntsville: H. L. BENNETT	Schenectady: R. J. GUTMANN
Baltimore: J. A. MOELLERS	India: S. K. KOUL	Seattle: J. MCCANDLESS
Beijing: W. LIN	Indonesia: S. NATANAGARA	Singapore: M.-S. LEONG
W. X. ZHANG	Israel: A. MADJAR	South Africa: D. B. DAVIDSON
Benelux: K. VAN'T KLOOSTER	Kitchener-Waterloo: Y. L. CHOW	South Australia: B. D. BATES
Buffalo: M. R. GILLETTE	A. NATHAN	South Brazil: A. O. M. ANDRADE
Central Iowa/Cedar Rapids: J. COZZIE	Korea: J. S. MYUNG	Southeastern Michigan: J. W. BURNS
Central & South Italy: O. M. BUCCI	Los Angeles: T. C. SHISHIDO	Spain: M. SALAZAR-PALMA
Central New England/Boston: P. H. CARR	Milwaukee: J. RICHIE	Springfield: K. M. LAU
Central Virginia: S. H. JONES	Montreal: G. L. YIP	St. Louis: R. W. KIEFEL
Chicago: E. G. BOGUS	New Hampshire: R. O. GEOFFROY	Sweden: J. F. JOHANSSON
Cleveland: K. B. BHASIN	New Jersey Coast: E. COLLETT	Switzerland: W. BACHTOLD
College Station: R. NEVELS	New South Wales: C. D. WILSON	Syracuse: T. SARKAR
Columbus: R. LEE	New York/Long Island:	Taipei:
Czechoslovakia: Z. SKVOR	North Italy: C. V. NALDI	Tokyo: Y. KOBAYASHI
Dallas: R. D. EPPICH	North Jersey: C. GUPTA	Toronto: T. E. VAN DEVENTER
Dayton: G. R. SIMPSON	Oregon:	Tucson: H. C. KOHLBACHER
Denver-Boulder: R. GEYER	Orlando: A. MORTAZAWI	Turkey: A. BUYUKALSOY
Egypt: I. A. SALEM	Ottawa: D. H. REEKIE	Twin Cities: M. J. GAWRONSKI
Finland: E. T. KEMPPINEN	Philadelphia: A. HOORFAR	Ukraine: N. VOITOVICH
Florida West Coast: H. W. HILL	Phoenix: C. A. GAW	United Kingdom/Ireland: T. H. OXLEY
Foothill: S. M. SAAD	Poland: J. W. MODELSKI	Venezuela: A. N. BIANCHI
France: R. ADDE	Princeton/Central Jersey: A. KATZ	Virginia Mountain: I. J. BAHL
Germany: F. ARNDT	Rio de Janeiro/Brazil: J. R. BERGMANN	Washington/Northern Virginia: J. I. UPSHUR
Greece: N. K. UZUNOGLU	San Diego: K.-L. P. YU	Winnipeg: H. MOHEB
Houston: J. T. WILLIAMS	San Fernando Valley: M. RADMANESH	Yugoslavia: B. JOCANOVIC

IEEE TRANSACTIONS® ON MICROWAVE THEORY AND TECHNIQUES

Editor	Associate Editors	
R. J. TREW	R. SORRENTINO	J. B. HORTON
	(Tutorial/Review Papers)	(Systems and Applications)
		P. W. STAECKER
		(Index Issues)

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. Officers

JAMES T. CAIN, <i>President</i>	JOEL B. SNYDER, <i>Vice President, Professional Activities</i>
WALLACE S. READ, <i>President-Elect</i>	W. KENNETH DAWSON, <i>Vice President, Publications</i>
CHARLES W. TURNER, <i>Secretary</i>	VUAY K. BHARGAVA, <i>Vice President, Regional Activities</i>
V. THOMAS RHYNE, <i>Treasurer</i>	E. G. KIENER, <i>Vice President, Standards Activities</i>
KENNETH R. LAKER, <i>Vice President, Educational Activities</i>	BRUCE EISENSTEIN, <i>Vice President, Technical Activities</i>

THEODORE W. HISSEY, JR., *Executive Director*
ROLF H. JANSEN, *Director, Division IV—Electromagnetics and Radiation*

Executive Staff

RICHARD D. SCHWARTZ, *Acting General Manager*
ANTHONY J. FERRARO, *Staff Executive, Publications*
FRANK R. MOORE, *Staff Executive, Volunteer Activities*

IRVING ENGELSON, *Staff Director, Corporate Activities*
PETER A. LEWIS, *Staff Director, Educational Activities*
MELVIN I. OLKEN, *Staff Director, Regional Activities*

ANDREW G. SALEM, *Staff Director, Standards Activities*
W. THOMAS SUTTLE, *Staff Director, Professional Activities*
ROBERT T. WANGEMANN, *Staff Director, Technical Activities*

Transactions/Journals Department

Staff Director: PATRICIA WALKER
Manager: GAIL S. FERENC
Electronic Publishing Manager: JERI L. UZZO
Managing Editor: VALERIE CAMMARATA
Senior Editor: ROBERT W. DAVIDSON
Associate Editors: MICHAEL J. HELLRIGEL, DAWN SPETH WHITE

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES is published monthly by the Institute of Electrical and Electronics Engineers, Inc. Responsibility for the contents rests upon the authors and not upon the IEEE, the Society/Council, or its members. **IEEE Corporate Office:** 345 East 47 Street, New York, NY 10017-2394 **IEEE Operations Center:** 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. **NJ Telephone:** 908-981-0060 **Price/Publication Information:** Individual copies IEEE Members \$10.00 (first copy only), nonmembers \$20.00 per copy. (Note: Add \$4.00 postage and handling charge to any order from \$1.00 to \$50.00, including prepaid orders.) Member and nonmember subscription prices available upon request. Available in microfiche and microfilm. **Copyright and Reprint Permissions:** Abstracting is permitted with credit to the source. Libraries are permitted to photocopy for private use of patrons, provided the per-copy fee indicated in the code at the bottom of the first page is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For all other copying, reprint, or republication permission, write to Copyrights and Permissions Department, IEEE Publications Administration, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. Copyright © 1995 by The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Second-class postage paid at New York, NY and at additional mailing offices. **Postmaster:** Send address changes to IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, IEEE, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. GST Registration No. 125634188. Printed in U.S.A.