



IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

AUGUST 1972

VOLUME MTT-20

NUMBER 8

Published Monthly



PAPERS

Yagi-Uda Array as a Surface-Wave Launcher for Dielectric Image Lines.....	<i>W. K. McRitchie and J. C. Beal</i>	493
Matrix Methods for Microstrip Three-Dimensional Problems.....	<i>A. Farrar and A. T. Adams</i>	497
Capacitance of Parallel Rectangular Plates Separated by a Dielectric Sheet.....	<i>P. Benedek and P. Silvester</i>	504
Equivalent Capacitances of Microstrip Open Circuits.....	<i>P. Silvester and P. Benedek</i>	511
Circular Waveguides Lined With Artificial Anisotropic Dielectrics.....	<i>C. T. M. Chang</i>	517
Propagation Mode and Scattering Loss of a Two-Dimensional Dielectric Waveguide with Gradual Distribution of Refractive Index.....	<i>Y. Suematsu and K. Furuya</i>	524
The Absolute Calibration of Periodic Microwave Phase Shifters Without a Standard Phase Shifter.....	<i>P. I. Somlo, D. L. Hollway, and I. G. Morgan</i>	532
The Exact Dimensions of a Family of Rectangular Coaxial Lines with Given Impedance.....	<i>H. J. Riblet</i>	538
Coupled Power Equations for Backward Waves.....	<i>D. Marcuse</i>	541

SHORT PAPERS

On Optimum Mirrors of the Fabry-Perot Resonator Filled with Anisotropic Medium.....	<i>T. Tanaka and M. Suzuki</i>	546
Use of the TEM Mode in Microwave Heating Applicators.....	<i>D. A. Johnston and W. A. G. Voss</i>	547
Feedthrough for Digital Latching Ferrite Phasers.....	<i>J. D. Hanfling and S. R. Monaghan</i>	549
A Dominant Mode Analysis of Microstrip.....	<i>R. P. Wharton and G. P. Rodrigue</i>	552
Octave-Band Microstrip DC Blocks.....	<i>D. LaCombe and J. Cohen</i>	555
Wave Propagation on Nonuniform Transmission Lines.....	<i>Å. Bergquist</i>	557
The Lowest Order Mode and the Quasi-TEM Mode in a Ferrite-Filled Coaxial Line or Resonator.....	<i>I. Wolff</i>	558

CONTRIBUTORS.....	561
-------------------	-----

INFORMATION FOR AUTHORS.....	564
------------------------------	-----



IEEE MICROWAVE THEORY AND TECHNIQUES GROUP

The Microwave Theory and Techniques Group is an organization, within the framework of the IEEE, of members with principal professional interest in the field of microwave theory and techniques. All members of the IEEE are eligible for membership in the Group and will receive this TRANSACTIONS upon payment of the annual Group membership fee of \$7.00. Affiliate membership is available upon payment of the annual affiliate fee of \$16.00. For information on joining write to the IEEE at the address below.

ADMINISTRATIVE COMMITTEE

A. CLAVIN, <i>President</i>		J. B. HORTON, <i>Vice President</i>		D. PARKER, <i>Secretary-Treasurer</i>	
F. R. ARAMS	H. W. COOPER	N. LIPETZ	G. P. RODRIGUE	E. N. TORGOW	
R. W. BEATTY	R. V. GARVER	S. OKWIT*	F. J. ROSENBAUM	A. WEXLER	
J. H. BRYANT*	G. I. HADDAD	J. M. OSEPCCHUK	S. W. ROSENTHAL	L. R. WHICKER	
	D. B. LEESON	R. A. RIVERS	H. SOBOL	L. YOUNG*	

* *Ex officio (past chairmen)*

Honorary Life Members

A. C. BECK	W. W. MUMFORD	G. C. SOUTHWORTH
------------	---------------	------------------

G-MTT Chapter Chairmen

Atlanta	T. J. LYON	Houston	H. C. BOURNE, JR.	Philadelphia	W. H. SCHAEDELA
Baltimore	B. A. SICHELSTIEL	Huntsville	M. D. FAHEY	Phoenix	M. D. SIRKIS
Boston	H. HOWE, JR.	Long Island	P. MEIER	St. Louis	
Buffalo		Los Angeles Council	N. PELNER	San Diego	J. H. PROVENCHER
Chicago	T. M. P. SMITH	Milwaukee	R. W. LADE	San Francisco	P. M. LATOURETTE
Columbus	R. T. COMPTON, JR.	Montreal	E. F. MORRIS	Schenectady	J. B. UNDERWOOD
Connecticut	R. MASTROIANNI	N. J. Coast	R. W. BENJAMIN	Seattle	F. P. CARLSON
Dallas	D. N. BOWYER	New Hampshire	W. J. WILSON	S. E. Michigan	W. C. CURTICE
Denver	S. W. MALEY	New York		Syracuse	W. T. WHISTLER
Florida-W. Coast	B. E. SIGMON	North Jersey	K. C. O'BRIEN	Tokyo, Japan	S. OKAMURA
Foothills, Calif.	H. P. JOHNSON	Orange County	D. K. WAINEO	Tucson	E. P. PIERCE
Fort Worth	S. D. COLEMAN	Orlando	J. M. SCHUCHARDT	Washington, D.C.	C. E. H. EDWARD

IEEE TRANSACTIONS® ON MICROWAVE THEORY AND TECHNIQUES

Editor		Associate Editors	
F. J. ROSENBAUM	N. LIPETZ (<i>Institutional Listings</i>)	F. G. R. WARREN (<i>Foreign Abstracts</i>)	J. W. BANDLER (<i>Computer Program Descriptions</i>)

Address all manuscripts to the Editor, F. J. Rosenbaum, Dep. Elec. Eng., Washington Univ., St. Louis, Mo. 63130. Submission of three copies of manuscripts, including figures, will expedite the review.

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

Officers

ROBERT H. TANNER, <i>President</i>	CLARENCE L. COATES, JR., <i>Vice President, Publication Activities</i>
HAROLD CHESTNUT, <i>Vice President</i>	ARTHUR P. STERN, <i>Secretary</i>
JOSEPH K. DILLARD, <i>Vice President, Technical Activities</i>	RAYMOND W. SEARS, <i>Treasurer</i>

Headquarters Staff

DONALD G. FINK, <i>General Manager</i>	
ELWOOD K. GANNETT, <i>Director, Editorial Services</i>	BETTY J. STILLMAN, <i>Executive Assistant to the General Manager</i>
WILLIAM J. HILTY, <i>Director, Convention and Publishing Services</i>	RICHARD M. EMBERSON, <i>Director, Technical Services</i>
WILLIAM J. KEYES, <i>Director, Administrative Services</i>	EDWIN D. MACDONALD, <i>Conference Services</i>
JOHN M. KINN, <i>Director, Educational Services</i>	SAVA I. SHERR, <i>Standards</i>
CHARLES F. STEWART, JR., <i>Director, Member Services</i>	

Editorial Department

H. JAMES CARTER, <i>Managing Editor, Transactions</i>	
Senior Editors: ANDRÉE ABRAMOFF, ANN H. BURGMAYER, CAROLYN ELENOWITZ, GAIL S. FERENC	
Associate Editors: NANCY B. BUDDIE, HELEN S. GOLDMAN, MARY M. HALL, RUTH MELNICK, NELA RYBOWICZ	

IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES is published monthly by The Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, N. Y. 10017. Responsibility for the contents rests upon the authors and not upon the IEEE, the Group, or its members. This journal is available in either microfiche or printed form. Individual copies may be purchased at \$3.00 (first copy only) by IEEE members and \$6.00 per copy by nonmembers. Annual subscription price: IEEE members, dues plus Group fee. Price for nonmembers available on request. Abstracting is permitted with mention of source. All rights, including translation, are reserved by the IEEE. Requests for republication permission should be addressed to the IEEE Editorial Department, 345 East 47 Street, New York, N. Y. 10017. Copyright © 1972 by The Institute of Electrical and Electronics Engineers, Inc. Printed in U.S.A. Second-class postage paid at New York, N. Y. and at additional mailing offices.