

# CONTENTS

## SECTION 1: CIRCUITS AND ALGORITHMS

- PARASPICE: A Portable Parallel Circuit Simulator 3  
*G-C. Yang*
- Parallel Computational Techniques for Simulating the  
Coupled Diffusion of Impurities and Defects in Silicon 15  
*R. Biswas, G.A.J. Amaratunga, A.G.R. Evans,  
P.T.E. Roberts*
- An Integrated CAD System for Device Model Design,  
Parameter Extraction and Circuit Simulation 31  
*A.T. Yang, S.M. Kang, G.C. Yang*
- A Hybrid Finite Element and Distributed Magnetic 43  
Equivalent Modelling Methodology for Electromagnetic Devices  
*L. Haydock, S. Holland, W.J. Hudson*
- Application of a Generalized Discrete Technique to 55  
Electrical Circuit Analysis  
*S.Y.R. Hui, C. Christopoulos*
- A Straight Forward Front-Width Reduction Program 65  
*N.K. Deshmukh*

## SECTION 2: PACKAGES AND PARTS

- A System for Experimental Data Intergration and Modeling 73  
Applied in Semiconductor Technology Development  
*K. Varahramyan*
- The FEMAX Finite-Element Package for Computing Three- 83  
Dimensional Electromagnetic Fields in Inhomogeneous Media  
*G. Mur*
- Automatic Mesh Generation Based on Expert-System-Methods 95  
*K. Reichert, J. Skoczylas, T. Tärnhuvud*
- Minimum Input Automatic Mesh Generator 109  
*E. Santini*

Development and Use of Finite Element Software for  
Electromechanical Analysis 123  
*A. Boglietti, M. Chiampi, D. Chiarabaglio*

Field Analysis Software Based on the Transmission-Line  
Modelling Method 135  
*C. Christopoulos*

### SECTION 3: CONTINUUM PROBLEMS

A Package for Nonlinear Optical Waveguides Based on  
*E*-Vector Finite Elements 151  
*X.H. Wang, G.K. Cambrell, L.N. Binh*

Quantum Mechanical Simulation of Long Wavelength  
Avalanche Photo-Diodes using Wigner-Function 163  
*H. Tsuchiya, M. Ogawa, S. Shimizu, N. Fujino, T. Miyoshi*

Inhomogeneous Neumann Boundary Excitations for  
Electromagnetic Finite Element Analysis 175  
*J.R. Brauer, B.E. MacNeal, V.D. Overbye, G.T. Hummert*

Is Three-Dimensional Electromagnetic Field Analysis  
Incompatible with Node-Based Finite Element Interpolation? 187  
*P.R. Kotiuga*

Application of Finite Element Method to Quantum Mechanical  
Simulation 191  
*M. Ogawa, M. Koga, H. Fukunaga, T. Miyoshi*

Magnetic Field Analysis of a Dipole in Human Brain by the  
Boundary Element Method 203  
*T. Nishino, T. Mashiko, A. Ishiyama*

### SECTION 4: SOFTWARE ENGINEERING

*Funmath*: Towards a General Formalism for System  
Description in Engineering Applications 215  
*R.T. Boute*

filterX: An Interactive Design Language for Filters 227  
*C. Ouslis, M. Snelgrove, A.S. Sedra*

Toward a Formal Standard of the SPICE Circuit Description  
Language 241  
*P.P. Silvester*

The Application of Extended Operational Paradigm in Designing Electrical Engineering Software <i>P. Kokol, B. Novak</i>	251
Object Orientated Design for Flexible Manufacturing Systems <i>M.T. Martinez, B. Shariat</i>	263
Object-Orientated Programming: An Original Application to Substations Design <i>J-L. Lilien, M. Pallage</i>	273
Translators: Towards Open Ended Finite Element Software and a Common Standard <i>S.R.H. Hoole, S. Ellsworth</i>	285

## **SECTION 5: POSTPROCESSING AND DESIGN**

Finite-Element Field Analysis for the Scattering and Immittance Matrix Elements of a General Multiport Microwave Network <i>B.G. Lawrence, G.K. Cambrell</i>	297
A Software Environment for Physical Parameter Extraction by Inverse Device Modelling <i>G.J.L. Ouwering, W. Crans</i>	307
CAE-Analysis Tools for Electrical Machine Design <i>R. Belmans, R. Findlay, E. Freeman, D. Verdyck, W. Geysen</i>	319
Force Calculations by Numerical Field Solutions <i>E.S. Hamdi, A.F. Licario-Nogueira</i>	331
CAD Electromagnetic Devices by Hybrid Finite Element Boundary Element Method <i>M. Trlep, B. Hribernik, P. Skerget, B. Kreca</i>	341
Verification of Softwares for 3-D Eddy Current Analysis Using IEEJ Model <i>T. Nakata, N. Takahashi, K. Fujiwara, P. Olszewski</i>	349
Electric Field Computation Description and Examples with Experimental Comparison <i>M.M. Defourny, M.A. Van Houten, T.F. Buss, E.J.M. Van Heesch</i>	361