

## TABLE OF CONTENTS

### Section 1 – MESH GENERATION

New Developments of Grid Optimization by the Grid Iteration Method P. Girdinio, G. Molinari and A. Viviani	3
A Mesh Generator with Automatic Bandwidth Reduction for 2-D and 3-D Geometries N. Ida	13
Finite Element Pre-Processing in Electromagnetics J.C. Sabonnadiere, Y. Du Terrail, G. Meunier and J.L. Coulomb	23
Representation of Space C. Stewart	37

### Section 2 – COMPUTER-AIDED DESIGN TECHNIQUES

Pre- and Post-Processing for Stream-Function Eddy Current Calculations J.F. Abel, Francis C. Moon and T.J. McCoy	47
GE2D – A User Friendly Software Package for Two Dimensional Electromagnetic Field Analysis M.V.K. Chari, G. Bedrosian, J. Berkery, M. Palmo and A. de Blois	55
Computer-Aided Design for Industrial DC Motors Using a Dedicated Microcomputer A. Konrad, R.K. Barton, J.F. Berkery, G. Bedrosian and M.V.K. Chari	67
Effect of Boundary Value Type on System Matrix Conditioning M.A. Golbazi and E. Della Torre	81
Renumbering and Preconditioning in the Conjugate Gradients Algorithm S.R.H. Hoole, Z.J. Cendes and P.R.P. Hoole	91
Second-Order Finite Element Analysis of Nonlinear Magnetics Z.J. Cendes and D. Sun	101

### Section 3 – MAGNETOSTATICS

Finite Element Analysis of Magnetic Recording Heads and Media J.R. Brauer and C.M. Perlov	111
--	-----

The New Version of the Finite Element 3D Magnetostatics Program MAGNUS S. Pissanetzky	121
<b>Section 4 – EDDY CURRENTS</b>	
The Use of Integral Equations and the Conjugate Gradient Method in Field Theory Problems K.R. Davey, J.P. Montgomery and M. Werby	135
The Application of WEMAP to Eddy Current Non-Destructive Evaluation V.K. Garg, J. Weiss, G. Mott and W.R. Junker	147
3-D Calculations of the Superconducting Super Collider (SSC) 3 Tesla Magnet R.J. Lari	157
3-D Eddy Current Problems and the Boundary Integral Equation Method I.D. Mayergoyz	163
Some Three Dimensional Eddy Current Algorithms Under Investigation in the UK C.W. Trowbridge	173
Eddy Current Analysis of the ZT-P Shells with EDDYNET L.R. Turner	181
<b>Section 5 – APPLICATIONS</b>	
The Coupling of Mechanical Dynamics and Induced Currents in a Cantilever Beam J.M. Bialek and D.W. Weissenburger	193
Temperature Prediction in WEMAP with Calculated Loss Densities M.L. Barton and L.E. Ware	205
Finite Element/Method of Characteristics Computations of Self-Consistent Charge Density – Electric Field Structures J.F. Hoburg and J.L. Davis	217
Finite Element Computation of Magnetic Fields from Lightning Return Strokes P.R.P. Hoole and S.R.H. Hoole	229
Boundary Integral Solution of Wave Effects in Laser-Annealed Silicon M.H. Lean	239
Hybrid Finite-Element Boundary-Element Solutions to Axisymmetric Scalar Potential Problems S.J. Salon and J.P. Peng	251

*Contents*

ix

**Characterization of Multi-Port Microwave Networks Using the Finite Element Method**  
N.N. Truyen

263

**Author Index**

275