

## CONTENTS

### INVITED PAPERS

Recent Progress in the Two-Dimensional Approximation of Three Dimensional Plate Models in Nonlinear Elasticity Philippe G. Ciarlet (University of Paris)	3
Formulation of Alternating-Direction Iterative Methods for Mixed Methods in Three Space Jim Douglas, Jr., Ricardo Durán and Paola Pietra (University of Chicago)	21
Iterative Methods for Singular Systems Ivo Marek (Charles University, Prague)	31
On Different Numerical Methods to Solve Singular Boundary Problems Francisco Michavila (Polytechnic University of Madrid)	45
Some Numerical Techniques for the Solution of Problems Related to Semiconductor Devices John J.H. Miller (Trinity College, Dublin)	69
Recent Progress in the Numerical Treatment of Singular Problems for Partial Differential Equations with Techniques Based on the Tau Method Eduardo L. Ortiz (Imperial College, London)	83
Present State and New Trends in Parallel Computation Rafael Portaencasa and Carlos Vega (Polytechnic University of Madrid)	99
Finite Element Methods for Treating Problems Involving Singularities, with Applications to Linear Elastic Fracture J.R. Whiteman (Brunel University, Uxbridge)	109
Finite Element Solution of the Fundamental Equations of Semiconductor Devices Miloš Zlámal (Technical University, Brno)	121

**CONTRIBUTED PAPERS****PART I: RESULTS ON COMPUTATIONAL LINEAR ALGEBRA****Interpolation and Related Techniques**

- On Aitken-Neville Formulae for Multivariate Interpolation  
M. Gasca and E. Lebrón (University of Zaragoza and Polytechnic University of Madrid) 133
- On Some Methods for the Construction of Smoothing Splines  
Jiří Hřebíček and František Šik (Czechoslovak Academy of Science, Brno) 141
- Generalized L-Splines as Solutions of an N-Point Boundary Value Problem  
Carmen Simerská (Technical University, Prague) 151

**Computational Linear Algebra**

- Computing Errorbounds for Eigenpairs Using the Precise Scalarproduct  
Götz Alefeld (University of Karlsruhe) 161
- Some Results on the AOR Iterative Method  
M. Madalena Martins (University of Coimbra) 171
- On the Speed of Convergence of the Total Step Method in Interval Computations  
Günter Mayer (University of Karlsruhe) 181

**PART II: DISCRETE VARIABLE METHODS****Finite Difference Methods, Finite Element Methods and Related Techniques**

- On the Stability of Variable Stepsize Adams Methods in Nordsieck Form  
M. Calvo, F.J. Lisbona and J.I. Montijano (University of Zaragoza) 193
- The Preconditioned Conjugate Gradient Method for Solving Elliptic Difference Equations  
D.J. Evans and I.C. Demetriou (Loughborough University of Technology) 205
- Accelerated Monotone Scheme for Finite Difference Equations Concerning Steady-State Prey-Predator Interactions  
Anthony W. Leung and Diego A. Murio (University of Cincinnati) 219
- A Note on Three-Term Recurrences and their Numerical Treatment  
Ivo Marek and Karel Žitný (Charles University and Czechoslovak Academy of Science, Prague) 235

Mixed Finite Elements Methods for Convection-Diffusion Problems Jean-Marie Thomas (University of Pau and l'Adour, Pau)	241
<b>Method of Lines</b>	
Numerical Methods of Solution of Evolution Equations of Hyperbolic Type Milan Pultar (Technical University, Prague)	251
Some Aspects of the Numerical Solution of Evolution Equations by the Method of Discretization in Time Karel Rektorys (Technical University, Prague)	259
<b>PART III: POLYNOMIAL AND RATIONAL APPROXIMATION METHODS</b>	
<b>Tau Method, Collocation and Spectral Techniques</b>	
Some Results of the Spectrum of Chebyshev Differencing Operator Daniele Funaro (University of Pavia)	271
On a New Boundary Element Spectral Method F.K. Hebeker (University GHS, Paderborn)	285
On Rational Approximation to Semigroups of Linear Operators Arturo Ribagorda and Carlos Vega (Polytechnic University of Madrid)	293
A Quick Survey of Recent Developments and Applications of the $\tau$ -Method Manuel R. de J. da Silva (University of Porto)	297
Cubic and Quintic Spline Extrapolated Collocation Methods for Two-Point Boundary Value Problems Maria Joana Soares (University of Minho, Braga)	309
Piecewise Polynomial Approximations for Cauchy Singular Integrodifferential Equations Peter Linz (University of California)	321
<b>PART IV: VARIATIONAL METHODS AND SPECIAL TECHNIQUES</b>	
<b>Variational Methods</b>	
Methods of Computation of Critical Points of Nonlinear Functionals Alexander Eydeland (University of Massachusetts)	331

Numerical Solutions of Degenerate and Pseudoparabolic Variational Inequalities Francesco Scarpini (University of Rome)	341
<b>Conformal Transformation Methods and Asymptotic Techniques</b>	
Numerical Conformal Mapping Techniques for the Solution of Two-Dimensional Laplacian Boundary Value Problems N. Papamichael and M.K. Warby (Brunel University, Uxbridge)	351
Linear Approximation, Asymptotic Expansion and Mixed Problem for Some Semi-Linear Wave Equations in 1 Dimension Alain Pham Ngoc Dinh (University of Orléans)	363
<b>PART V: APPLICATIONS</b>	
<b>Differential Equations in Numerical Problems of Science and Engineering</b>	
Application of the Characteristics Method with Variable Time-Step to Steady-State Convection-Diffusion Problems Alfredo Bermúdez and José Durany (University of Santiago de Compostela)	377
Homogeneization of Slightly Compressible Inviscid Flows T. Chacon and O. Pironneau (University of Seville, University of Paris and INRIA, Paris)	387
Continuation of Periodic Solutions in Ordinary Differential Equations with Application to the Hodgkin-Huxley Model Martin Holodniok and Milan Kubiček (Institute of Chemical Technology, Prague)	397
A Newton/BI-Conjugate Gradient Continuation Procedure for Buoyancy Flows S. Sivaloganathan and J.S. Rollett (University of Oxford)	411
IST Numerical Schemes for Nonlinear Evolution Equations of Physical Interest Thiab R. Taha and Mark J. Ablowitz (University of Georgia and Clarkson University, Potsdam)	425