

CONTENTS

Preface

1	Error Estimation and Control in Computational Fluid Dynamics <i>J.T. Oden</i>	1
2	Reliability of Computational Mechanics <i>I. Babuška</i>	25
3	Numerical Techniques for Problems of Quasistatic and Dynamic Viscoelasticity <i>S. Shaw, M.K. Warby and J.R. Whiteman.</i>	45
4	Numerical Simulation of Non-Newtonian Flow through an Axisymmetric Contraction <i>A. Baloch, P. Townsend and M.F. Webster</i>	69
5	Approximate Approximations <i>V. Maz'ya</i>	77
6	A New Paradigm for Adaptive Finite Element Methods <i>C. Johnson</i>	105
7	Mesh optimality criteria for adaptive finite element computations <i>E. Oñate and G. Bugeda</i>	121
8	New Developments in Applications of <i>hp</i> -Adaptive BE/FE Methods to Elastic Scattering <i>L. Demkowicz and J.T. Oden</i>	137
9	A Posteriori Error Estimates for Stokes and Navier Stokes Equations <i>M. Ainsworth</i>	151
10	A Zooming-Technique Using a Hierarchical <i>hp</i> -Version of the Finite Element Method <i>E. Rank</i>	159
11	A Substructured Elastic-Plastic Fracture Analysis Program for Parallel Processing on Transputer Networks <i>H. van Lengen, B. May, F.-G. Buchholz and H.A. Richard</i>	171

12	An Efficient Iterative Parallel Finite Element Computational Method <i>K.P. Wang and J.C. Bruch, Jr.</i>	179
13	Application of a Variational Method for Computing Smooth Stresses, Stress Gradients, and Error Estimation in Finite Element Analysis <i>A. Tessler, H.R. Riggs, and S.C. Macy</i>	189
14	A Parallel Numerical Model for Subsurface Contaminant Transport With Biodegradation Kinetics <i>T. Arbogast and M.F. Wheeler</i>	199
15	Unstructured Grid Methods for High Speed Compressible Flows <i>K. Morgan, J. Peraire, J. Peiró and O. Hassan</i>	215
16	Simulation of Dense Non-aqueous Phase Fluid Flow in Porous Media using Collocation Finite Elements <i>J.F. Guarnaccia and G.F. Pinder</i>	243
17	A Complementary Volume Approach for Modeling Three-Dimensional Navier-Stokes Equations Using Dual Delaunay/Voronoi Tessellations <i>J.C. Cavendish, C.A. Hall and T.A. Porsching</i>	255
18	A Posteriori and A Priori Error Analysis of Finite Volume Methods <i>K.W. Morton and E. Süli</i>	267
19	Adaptive Finite Volume Methods for Hyperbolic Problems <i>J.A. Mackenzie, T. Sonar and E. Süli</i>	289
20	Reliable Finite Volume Methods for Time-Dependent Partial Differen- tial Equations <i>M. Berzins and J. Ware</i>	299
21	Non-Reflecting Finite Elements <i>D. Givoli and J.B. Keller</i>	307
22	A Dispersion Analysis of Finite Element Methods on Triangular Grids for Maxwell's Equations <i>P.B. Monk, A.K. Parrott and P.J. Wesson</i>	315
23	Coupling of FEM and BEM for Transonic Flows <i>H. Berger, G. Warneke and W.L. Wendland</i>	323

ABSTRACTS OF OTHER PAPERS

On gradient smoothing in grids with singularity element patches <i>J. Aalto, J. Louhivirta and J.R. Whiteman</i>	351
Time-dependent finite element solution of Boltzmann equation for photon transport <i>R.T. Ackroyd, C.R.E. de Oliveira and A.J.H. Goddard</i>	352
Stresses computed from hierarchic plate models <i>R.L. Actis and B.A. Szabó</i>	352
Boundary integral equations for the exterior acoustic problem <i>S. Amini and N.D. Maines</i>	353
On the modelling errors in fracture analysis of delaminated plates <i>B. Andersson</i>	354
A finite difference method of determination of local coefficients in dental enamel and other inhomogeneous permeable media <i>P. Anderson, J.C. Elliott and S.E.P. Dowker</i>	355
Anisotropic finite elements and application to edge singularities <i>T. Apel</i>	355
The boundary layer for the Reissner-Mindlin plate model <i>D.N. Arnold</i>	356
A stablized Galerkin finite element method for solving the Boussinesq equations <i>A. Auge and G. Lube</i>	356
A new elemental formulation for the dynamic analysis of structures <i>S. Azimi</i>	357
A finite volume procedure to predict deformation and residual stress in castings <i>C. Bailey, M. Cross and P. Chow</i>	357
Adaptive methods for grid generation and finite element solutions of time-dependent partial differential equations <i>M.J. Baines</i>	358
Influence of Extensional Viscosity on Vortex Development in Complex Geometries <i>A. Baloch, P. Townsend and M.F. Webster</i>	359

On the approximation of junctions between thin shells by curved C^1 -finite element methods <i>M. Bernadou</i>	359
On the discretization of an optimal design problem for an unilaterally supported viscoelastic plate <i>I. Bock and J. Lovisek</i>	360
A hybrid direct-iterative method for the solution of finite element linear systems with positive definite matrices <i>L. Brusa and F. Riccio</i>	361
Hybrid Arnoldi-Newton Algorithm <i>T. Bulenda</i>	362
A FEM Approach for the Analysis of Composite Elements <i>M. Buonsanti</i>	362
Cubic finite elements in elliptic problems with interfaces and singularities <i>P. Burda</i>	363
Computation of the homogenized behaviour of a gasket <i>P. Cartraud, C. Wielgosz and O. Debordes</i>	364
Adaptive mesh refinement for the 3D magnetic code TRIFOU <i>P. Chaussecourte, B. Métivet and G. Nicolas</i>	364
Extrapolation methods for the streamline diffusion finite element method <i>H. Chen and R. Rannacher</i>	365
A new model of jointed rock masses reinforced by passive, fully-grouted bolts <i>S.H. Chen</i>	366
Structural dynamic finite element analyses of space shuttle propulsion components <i>E.R. Christensen</i>	367
Domain decomposition techniques for massively parallel machines <i>R.K. Coomer and I.G. Graham</i>	368
p -version preconditioning for the mass matrix <i>A. Craig</i>	368
Nonhomogeneous degenerate eigenvalue problem <i>P. Drábek</i>	369

A flux continuous approximation of the pressure equation for h -adaptive grids	370
<i>M.G. Edwards</i>	
Parallel implementation of the hp -version of the finite element method on a shared-memory computer	371
<i>H.C. Elman</i>	
Numerical approximation and asymptotic properties of some two dimensional plate models	371
<i>R. Falk</i>	
The uncoupling of boundary integral and finite element methods for nonlinear boundary value problems	371
<i>G.N. Gatica and G.C. Hsiao</i>	
New high order infinite elements with different decay types	372
<i>L. Gavete, C. Manzano and A. Ruiz</i>	
Using explicit preconditioned schemes for solving initial/boundary value problems	373
<i>G.A. Gravvanis and E.A. Lipitakis</i>	
Use of computer algebra systems to generate element stiffness matrices	373
<i>D.V. Griffiths</i>	
Newton's method for obstacle problems	374
<i>C. Grossmann</i>	
LAPACK: High performance software for linear algebra	375
<i>S. Hammarling</i>	
Finite element methods for general second-order elliptic partial differential equations: Model problems	375
<i>I. Harari and T.J.R. Hughes</i>	
The Fourier-finite element method for elliptic problems with axisymmetric edges	376
<i>B. Heinrich</i>	
Nodal finite element methods for partial differential equations	376
<i>J.P. Hennart</i>	
Finite elements for extended variational formulation in nonlinear problems	377
<i>Z. Kestřánek</i>	

A parallel semi-discrete Galerkin splitting method for second-order hyperbolic equations	378
<i>A.Q.M. Khaliq</i>	
On the stability of layered circular rings	379
<i>B. Kovács and F.J. Szabó</i>	
Free vibrations of layered circular ring segments	379
<i>B. Kovács and F.J. Szabó</i>	
Finite element approximation of a nonlinear anisotropic heat conduction problem	380
<i>M. Křížek</i>	
A variational inequality formulation for flow theory plasticity	381
<i>M.S. Kuczma and J.R. Whiteman</i>	
A BE-formulation for finite strain elastoplasticity	381
<i>G. Kuhn</i>	
Adaptive mesh refinement in the finite element method	382
<i>G. Kunert</i>	
The factorization of unstructured sparse symmetric positive definite matrices on distributed memory MIMD parallel computers	382
<i>R. Levkowitz and G. Mitra</i>	
The application of the Finite Element Method to the solution of nonlinear partial differential equations and a comparison to the Finite Difference Method	383
<i>H. Maisch, H. Karl and G. Lehner</i>	
Balancing domain decomposition preconditioners and discontinuous coefficients	383
<i>J. Mandel</i>	
Fast iterative solvers for p -version solids, plates, and shells	384
<i>J. Mandel</i>	
Finite element analysis of turbulent flow through an orifice meter with a concentric obstruction of conical shape at its centre	384
<i>M.R. Mokhtarzadeh-Dehghan, D.J. Stephens and L. Yu</i>	
Remarks on a-posteriori error estimation for finite elasticity	385
<i>R. Mücke and J.R. Whiteman</i>	

Contents	xi
Finite element analysis in nuclear safety <i>J. Nedoma</i>	385
FEM analysis of artificial substitutes of human joints and their optimal design <i>J. Nedoma</i>	386
Numerical simulation of flow circulation in the golden horn <i>H. Örs</i>	386
Error estimates for discretized boundary element methods for three-dimensional crack problems <i>F. Penzel</i>	387
A simple and efficient solution for the facet approximation of shells <i>E.D. Provdas</i>	388
Anisotropic <i>h</i> -adaptive finite element method for hypersonic viscous flows with shock-boundary layer interaction <i>W. Rachowicz</i>	388
On preconditioning for finite element equations on irregular grids <i>A. Ramage and A.J. Wathen</i>	388
A precis of developments in modelling embedded reinforcement for the finite element analysis of reinforced concrete structures <i>A. Ranjbaran</i>	389
Improving the accuracy of finite-element solutions to two-dimensional elliptic problems <i>S. Rippa and B. Schiff</i>	390
The numerical resolution of boundary layers and locking effects in the Reissner-Mindlin plate model <i>C. Schwab and M. Suri</i>	391
Numerical experience with grid adjustment based on a posteriori error estimators <i>K. Segeth</i>	391
Efficient preconditioners for incompressible flow <i>D. Silvester and A.J. Wathen</i>	392
Numerical solution of a parabolic equation with a weakly singular positive type memory term <i>M. Slodička</i>	392

Design optimization of rubber elastic structures <i>E. Stein and F.-J. Barthold</i>	393
On linear and bilinear elements for Reissner-Mindlin plates <i>R. Stenberg</i>	393
Finite element solution of unsteady-state mass transfer through a stationary liquid <i>J.L. Torres</i>	394
A family of triangular plate bending elements, as a basis for geometrically nonlinear shallow shell elements <i>F. van Keulen</i>	395
On an external finite element method for a second- order eigenvalue problem on a concave 2D-domain with Dirichlet boundary conditions <i>M. Vanmaele</i>	395
The computational modelling of the thermoforming process for the creation of axisymmetric container structures <i>M.K. Warby and J.R. Whiteman</i>	395
Element-by-element preconditioning <i>A.J. Wathen</i>	396
A posteriori error indicator and estimator for time-space FE discretization of parabolic problems <i>J. Weisz</i>	397
Finite-element solutions for mechanical drilling methods <i>H. Wern</i>	398
Improved patch stress recovery procedure by equilibrium and boundary conditions <i>N-E. Wiberg and F. Abdulwahab</i>	398
Matrix and image decomposition using wavelets <i>J.R. Williams and K. Amaratunga</i>	399
A general bond-slip formulation for embedded reinforcing bar elements <i>Z.P. Wu and D. Phillips</i>	400
INDEX	401