

TABLE OF CONTENTS

NUMERICAL ALGEBRA AND SOFTWARE/ ALGEBRE ET LOGICIEL NUMERIQUES

| | |
|---|-----|
| The Use of Pre-Conditioning over Irregular Regions G.H. Golub (U.S.A.) and D. Mayers (G.B.) | 3 |
| Matrix Computational Processes in Subspaces Yu.A. Kuznetsov (U.S.S.R.) | 15 |
| Iterative Methods for Elliptic Problems on Regions Partitioned into Substructures and the Biharmonic Dirichlet Problem O.B. Widlund (U.S.A.) | 33 |
| Iterative Methods for Discrete Elliptic Equations S.V. Parter and M. Steuerwalt (U.S.A.) | 47 |
| The Solution of Nearly Symmetric Sparse Linear Equations I.S. Duff (G.B.) | 57 |
| Toeplitz Matrices and their Applications V.V. Voevodin and E.E. Tyrtshnikov (U.S.S.R.) | 75 |
| The Look Ahead Lanczos Algorithm for Large Unsymmetric Eigenproblems B.N. Parlett, D.R. Taylor, and Z.-S. Liu (U.S.A.) | 87 |
| On the Constructive Study of the Wellposedness of the Inverse Sturm-Liouville Problem A. Mizutani (Japan) | 97 |
| Modulef and Composite Materials D. Begis, S. Dinari, G. Duvaut, A. Hassim, and F. Pistre (France) | 109 |
| NONLINEAR ANALYSIS/ ANALYSE NON LINEAIRE | |
| Numerical Methods for Hopf Bifurcation and Continuation of Periodic Solution Paths E.J. Doedel, A.D. Jepson (Canada), and H.B. Keller (U.S.A.) | 127 |
| On Some Multigrid Finite Difference Schemes which Describe Everywhere Non Differentiable Functions M. Yamaguti and M. Hata (Japan) | 139 |

| | |
|---|-----|
| Partial Differential Equations with Hysteresis Functionals A. Visintin (Italy) | 149 |
| Normal Forms for Singularities of Nonlinear Ordinary Differential Equations S. Ushiki (Japan) | 163 |
| Discrete Asymptotic Behavior for a Nonlinear Degenerate Diffusion Equation T. Ikeda (Japan) | 173 |
| MULTIGRID METHODS/ METHODES MULTIGRILLES | |
| Software Development Based on Multigrid Techniques (Summary) K. Stüben, U. Trottenberg, and K. Witsch (F.R.G.) | 187 |
| Parabolic Multi-Grid Methods W. Hackbusch (F.R.G.) | 189 |
| Multigrid Acceleration of an Iterative Method with Application to Transonic Potential Flow Z. Nowak (Poland) and P. Wesseling (The Netherlands) | 199 |
| PARALLEL COMPUTING/ CALCUL PARALLELE | |
| The Fifth Generation Computer Systems and its Computer Architecture H. Tanaka (Japan) | 221 |
| Increasing the Performance of Mathematical Software through High-Level Modularity J.J. Dongarra (U.S.A.) | 239 |
| Quelques Progrès en Calcul Parallèle et Vectoriel J. Erhel, W. Jalby, A. Lichnewsky, and F. Thomasset (France) | 249 |
| Vector Preconditioning for the Conjugate Gradient on Cray-I and CDC Cyber 205 G. Meurant (France) | 255 |
| A Generalization of the Numerical Schwarz Algorithm G. Rodrigue and J. Simon (U.S.A.) | 273 |
| Computing Generalized Inverses and Eigenvalues of Symmetric Matrices Using Systolic Arrays R. Schreiber (U.S.A.) | 285 |
| ASYMPTOTIC EXPANSION AND HOMOGENEIZATION/ EXPANSION ASYMPTOTIQUE ET HOMOGENEISATION | |
| Remarques sur l'Homogénéisation J.-L. Lions (France) | 299 |

| | |
|--|-----|
| Asymptotic Expansions for Finite Element Approximation of Elliptic Problem on Polygonal Domains Lin Qun and Lu Tao (China) | 317 |
| PARTICLE AND SPECTRAL METHODS/ METHODES PARTICULAIRES ET SPECTRALES | |
| On Some Applications of the Particle Method P.-A. Raviart (France) | 325 |
| Recent Advances in the Analysis of Chebyshev and Legendre Spectral Methods for Boundary Value Problems C. Canuto (Italy) | 335 |
| NONLINEAR ELASTICITY AND STRUCTURAL MECHANICS/ ELASTICITE NON LINEAIRE ET MECANIQUE DES STRUCTURES | |
| Algorithmes Efficaces pour les Calculs en Post-Flambement C. Petiau and C. Cornuault (France) | 355 |
| Simulation Numérique des Contraintes aux Interfaces Prothèse de Hanche-Os M. Bernadou, P. Christel, and J.M. Crolet (France) | 381 |
| Vibrations with Unilateral Constraints M. Schatzman (France) and M. Bercovier (Israel) | 401 |
| Numerical Solution of a Model Problem from Collapse Load Analysis M.L. Overton (U.S.A.) | 421 |
| INCOMPRESSIBLE FLOWS/ ECOULEMENTS INCOMPRESSIBLES | |
| Global Existence Theorems on Nonstationary Stratified Flow of Incompressible Viscous Fluid H. Okamoto (Japan) | 441 |
| Spatial Discretization Techniques for the Navier-Stokes Equations: Theoretical and Computational Results L.R. Scott (U.S.A.) | 451 |
| Application des Méthodes de Décomposition aux Calculs Numériques en Hydraulique Industrielle J.P. Benque, J.P. Gregoire, A. Hauguel, and M. Maxant (France) | 471 |
| COMPRESSIBLE FLOWS/ ECOULEMENTS COMPRESSIBLES | |
| On a Class of TVD Schemes for Gas Dynamic Calculations H.C. Yee, R.F. Warming, and A. Harten (U.S.A.) | 491 |

| | |
|--|-----|
| Multidimensional Explicit Difference Schemes for Hyperbolic Conservation Laws B: Van Leer (The Netherlands) | 493 |
| Efficient Construction and Utilisation of Approximate Riemann Solutions P.L. Roe and J. Pike (G.B.) | 499 |
| A Shock-Capturing Finite Element Method T.J.R. Hughes (U.S.A.) | 519 |
| Triangular Finite Element Methods for the Euler Equations F. Angrand, V. Boulard, A. Dervieux, J. Périaux (France) and G. Vijayasundaram (India) | 535 |
| Numerical Methods for the Time Dependent Compressible Navier-Stokes Equations M.O. Bristeau, R. Glowinski, B. Mantel, J. Périaux, and P. Perrier (France) | 565 |
| TURBULENT FLOWS/ ÉCOULEMENT TURBULENTS | |
| Large Eddy Simulation: The Next Five Years J.H. Ferziger (U.S.A.) | 587 |
| Convection of Microstructures (II) C. Bègue, T. Chacon, O. Pironneau (France) D.W. McLaughlin, G.C. Papanicolaou (U.S.A.) | 595 |
| COMBUSTION | |
| Prediction of In-Cylinder Processes in Reciprocating Internal Combustion Engines A.D. Goman (G.B.) | 609 |
| MULTIPHASE PROBLEMS IN OIL RESERVOIR SIMULATIONS/ PROBLÈMES MULTIPHASIQUES EN GISEMENTS DE PÉTROLE | |
| Improved Accuracy through Superconvergence in the Pressure in the Simulation of Miscible Displacement J. Douglas, Jr. (U.S.A.) | 633 |
| Mixed Finite Element Methods for Petroleum Reservoir Engineering Problems M.F. Wheeler and R. Gonzalez (U.S.A.) | 639 |
| Some Recent Progress in Steep Front Calculations for Porous Flow P. Concus, E. Kostlan, and J.A. Sethian (U.S.A.) | 659 |
| Simulation de Puits dans les Modèles de Réservoirs aux Éléments Finis G. Chavent (France) | 673 |

SEMI-CONDUCTORS/
SEMI-CONDUCTEURS

| | |
|--|-----|
| Diffusion d'Impuretés avec Oxydation A. Gerodolle, A. Marrocco, and S. Martin (France) | 687 |
| Finite-Element Solution of the Semiconductor Transport Equations B.M. Grossman, E.M. Buturla, and P.E. Cottrell (U.S.A.) | 697 |
| Some Recent Results and Open Questions in Numerical Simulation of Semiconductor Devices M.S. Mock (Israel) | 713 |