

HIGH PERFORMANCE COMPUTING II

Proceedings of the Second Symposium on
High Performance Computing
Montpellier, France, 7–9 October 1991

edited by

M. DURAND

IBM

Montpellier, France

F. EL DABAGHI

INRIA

Rocquencourt, France



1991

NORTH-HOLLAND
AMSTERDAM • LONDON • NEW YORK • TOKYO

CONTENTS

- *PARALLELISM: ARCHITECTURES, ALGORITHMS AND COMPILERS*

"Combining Allocation and Scheduling" N. Abdennadher, J.C. Angue	3
"Modelling and Evaluation of a Task Farm Chemical Application on MIMD Architectures" R. Baraglia, R. Ferrini, D. Laforenza, R. Peregó, O. Gervasi, A. Laganà	17
"A Study of I/O Architecture for High Performance Next Generation Computers" A. Sah, D.C. Verma, V.G. Oklobdjiza	31
"Data Locality and Memory System Performance in the Parallel Simulation of Ocean Eddy Currents" J. P. Singh, J. L. Hennessy	43
"Scalability, Granularity and Performance of Parallel Algorithms" L. Brochard	59
"A Parallel Genetic Algorithm for Process-Processors Mapping" T. Muntean, E-G. Talbi	71
"Fast Sorting Algorithm Based on the Massive Parallelism of Optical Computing" Y.B. Karasik	83
"Crystal Scheme, A Language for Massively Parallel Machines" C. Queinnec	91
"Implementation Issues of an Efficient Dependence Analysis Component for Parallelizing Compilers" A-E. Al-Ayyoub, T. Terzioglu, M. Guler	103
"On Parallel Program Generation for Massively Parallel Architectures" M. R. Werth, P. Feautrier	115
"Automatic Parallelization of Structured IF Statements without IF Conversion" M.C. Giboulot, F. Thomasset	127
"Debugger Visualizations for Shared-Memory Multiprocessors" C.M. Pancake, S. Utter	145
"Heterogeneity in High Performance Computing" D. Menascé, V. Almeida	159

"Micro-Measurements of a Supercomputer and Models for Memory Contention" H. Häfner, W. Schönauer	169
"A Simulator for Performance Prediction and Evaluation" G. S. Singh, D. A. Rane, S. Gumphekar, S. Apte	181
"A Case-study in Performance Programming: Seismic Migration" G. Almasi, B. Alpern, L. Berman, L. Carter, D. Hale	195
"Matrix Factorization on a RISC Workstation Network" A. Benzoni, V.S. Sunderam, R. van de Geijn	207
"Lattice Gas Computing on a RISC Workstation" S. Succi, G. Betello, F. Papetti	219

NUMERICAL METHODS FOR SUPERCOMPUTERS

"The von Neumann-Ulam Monte Carlo Method for Solving Systems of Linear Algebraic Equations on a Parallel Computer" E. Kamgnia	233
"The Parallel Solution of Triangular Systems of Linear Equations" R. Dias da Cunha, T. Hopkins	245
"Evaluation of an Element by Element Preconditioner for the Conjugate Gradient Method" J. Erhel, A. Traynard, M. Vidrascu	257
"High Performance GEMM-based Level-3 BLAS: Sample Routines for Double Precision Real Data" B. Kagström, P. Ling, C. Van Loan	269
"A 2-D Finite Volume/Finite Element Euler Solver on a MIMD Parallel Machine" L. Fezoui, F. Lorient, M. Lorient, J. Regere	283
"A Cartesian Grid Finite Element Method for Potential Flows" Q.V. Dinh, J.W. He	295
"Concurrent Evaluation of Boundary Conditions for the Euler Equations" P. Olsson	307
"Calculation of Incompressible Channel Flow on a Distributed-Memory Parallel Computer" J. Chung, M. Holt	321
"Direct Solution of Two-Dimensional Finite Element Equations on Distributed Memory Parallel Computers" O. Zone, R. Keunings	333
"Parallel Stochastic Finite Element Analysis on Distributed Memory Multiprocessors" S. Chinchalkar, D. L. Taylor	345
"Implementation of Domain Decomposition Methods on Shared Memory Multiprocessors" L. Giraud, J.C. Miellou, P. Spiteri	357
"An Efficient Algorithm for the Numerical Solution of a Linear Hyperbolic System Using Vector-Parallel Hardware" M. Asch	369

"Simulated Computation in Automatic Classification" P. Michaud	381
"Particle Simulation Schemes for Microscopic Dynamics" H. Babovsky	397
"On Definition of Matrices' Spectra" V.I. Kostin	407
"Stability Analysis in Aeronautical Industries" F. Chatelin, S. Godet-Thobie	415
"Reducing Round-Off Error in Chebyshev Pseudospectral Computations" E.E. Rothman	423
"Arithmetic Reliability of Algorithms" F. Chatelin, V. Frayssé	441
• <i>HIGH PERFORMANCE COMPUTING APPLICATIONS</i>	
"An External Unsteady Flow Navier-Stokes Solver on a Vector Computer" M. Braza, G. Jin, P. Nogueas, A. Sevrain	453
"An Accurate and Efficient Code for the Direct Numerical Simulation of Transition to Turbulence" U. Rist	467
"Inviscid Hypersonic Nozzle Flows in Chemical and Vibrational Non-Equilibrium State" M.C. Druguet, D. Zeitoun, R. Brun	479
"On the Numerical Treatment of the Advective Terms in 3D Shallow Water Models" E. D. de Goede	491
"Finite-Difference Time-Domain Analysis of Arbitrarily Shaped H-Plane Waveguide Discontinuities" E.A. Navarro, V. Such	503
"Numerical Study of Dynamical Properties of Very Large Percolating Clusters in d-Dimensions" E. Royer, C. Benoit, G. Poussigue	513
"Numerical Calculations of Electronic Structure of Large Period Semiconductor Strained Superlattices" D. Bertho, D. Boiron, A. Simon, J.M. Jancu, C. Jouanin	525
"Applications of Computer Simulation of Molecular Dynamics: Conformational Studies, Molecular Modeling and Free Energy Perturbation Calculations on New Serine Proteinase Inhibitors" L. Chiche, A. Heitz, A. Padilla	537
"Calculation of Geometrical Descriptors and Topological Indices of Molecules. A Vectorized Program" F. Torrens, E. Orti, J. Sanchez-Marin	549
"High Performance Computing in Fluid Mechanics Applied to Design Activities in Transport Industry" N. Montmayeur, S. Carta, S. Aïta, A. Tabbal	561

"Lattice Gases: A New Approach to Single and Multiphase Flow Simulations" S. Zaleski	575
"Fully Implicit Spectral Methods for Convection" J. Fröhlich, T. Gerhold, J.M. Lacroix, R. Peyret	585
"Numerical Analysis of Thermosolutal Convection by a Control Volume Method" C. Béghein, F. Allard, P. Depecker	597
"On the Difficulties in Computing Bifurcation Points: Application to Buoyant Plumes" G. Desrayaud, G. Lauriat	609
"Transports in Reconstructed Porous Media" J.F. Thovert, J. Sallès, P.M. Adler	623
"Viscoelastic Model for the Human Cornea" K. Hanna, F.E. Jouve, A. Kaiss, P. Le Tallec	631
"Computer Integrated Manufacturing, Parallelization of Applications, Results and Criteria for Further Candidates" P. Massotte, C. Paul, D. Robert	641
"Valuation of Options on Bonds on a Vector and Parallel Computer" C. Daher, M. Romano	653
"SPES: A Parallel Forecasting Model for the Italian Social Security Institute" P. Di Chio, S. Indrio, A.M. Marchetti	663