

CONTENTS

Editor's Preface E. Gelenbe	v
PARALLEL ALGORITHMS	
Techniques for Parallel Manipulation of Sparse Matrices C.P. Kruskal, L. Rudolph and M. Snir	3
Systolic Designs for Matrix Inversion and Solution of Linear Systems Using Matrix Powers D.J. Evans and K. Margaritis	15
Parallelizing the Finite Element Method for OPSILA J.P. Dalban, F. Boeri and M. Auguin	31
Optimal Scheduling Algorithms for Parallel Gaussain Elimination Y. Robert and D. Trystram	41
Synthesis of Efficient Systolic Arrays for Matrix Algebra Problems P. Clauss, C. Mongenet and G.R. Perrin	53
A Hierarchical Data-Driven Model for Multi-Grid Problem Solving W. Najjar and J.-L. Gaudiot	67
PERFORMANCE MEASUREMENT	
Performance Measurement Instrumentation for Multiprocessor Computers R.J. Carpenter	81
Benchmarking Concurrent Supercomputers C.F. Baillie and E.W. Felten	93

Design Factors for Parallel Processing Benchmarks G. Lyon	103
PERFORMANCE ANALYSIS	
Performance Analysis of LU Factorization on Hypercube Multiprocessor System A. Ghafoor, A.L. Goel and M.S. Ahsan	117
On the Performance Evaluation of Fine-Grained SIMD Computer Architectures: An Analysis of the Connection Machine R.A. Upton and S.K. Tripathi	129
PERFORMANCE MODELING OF PARALLEL SYSTEMS	
The Performance of Processor Sharing for Scheduling Fork-Join Jobs in Multiprocessors D. Towsley, C.G. Rommel and J.A. Stankovic	145
Approximating Task Response Times in Fork/Join Queues R. Nelson and A.N. Tantawi	157
A Memory Interference Model for Multiprocessors J.L. Melús, E. Sanvicente and J. Magriñá	169
On the quality of approximations for High-Speed Rings V. Rego and W. Szpankowski	179
Performance of a Vector Computer with Memory Contention M. Crehange, J.-M. Frailong and B. Plateau	195
USER NEEDS AND NEW ARCHITECTURES	
High Performance Transaction Processing with Memory Resident Data H. Garcia-Molina and K. Salem	211
The SCS-40 and Contributing Technologies: A Historical Context for the Development of a New Machine H. Potash	225
Supercomputing for Academic and Research Institutions J.-L. Delhayé	245

DISTRIBUTED COMPUTATIONS AND SYSTEMS

Definitions of Granularity

C.P. Kruskal and C.H. Smith

257

The Performance of Block Structured Programs on Processors Subject to
Failure and Repair

P.F. Chimento and K.S. Trivedi

269