

Table of Contents

Preface	v
Referees	vi
Committees	vii

Wednesday

Session 1a:

Chair: D. Eppstein

An On-Line Algorithm for Improving Performance in Navigation.....	2
<i>A. Blum and P. Chalasani</i>	
On the Value of Information in Coordination Games	12
<i>S. Irani and Y. Rabani</i>	
Heat & Dump: Competitive Distributed Paging	22
<i>B. Awerbuch, Y. Bartal, and A. Fiat</i>	
Throughput-Competitive On-Line Routing.....	32
<i>B. Awerbuch, Y. Azar, and S. Plotkin</i>	

Session 1b:

Chair: R. Fagin

NP Trees and Carnap's Modal Logic.....	42
<i>G. Gottlob</i>	
Logical Reducibility and Monadic NP	52
<i>S.S. Cosmadakis</i>	
Gates Accept Concurrent Behavior	62
<i>V. Gupta and V. Pratt</i>	
Parallel Computable Higher Type Functionals.....	72
<i>P. Clote, A. Ignjatovič, and B. Kapron</i>	

Session 2a:

Chair: R. Kosaraju

Random Sampling in Matroids, with Applications to Graph Connectivity and Minimum Spanning Trees.....	84
<i>D.R. Karger</i>	
Simulated Annealing for Graph Bisection	94
<i>M. Jerrum and G.B. Sorkin</i>	
Using Difficulty of Prediction to Decrease Computation: Fast Sort, Priority Queue and Convex Hull on Entropy Bounded Inputs.....	104
<i>S. Chen and J.H. Reif</i>	

Session 2b:

Chair: S. Mahaney

The Shrinkage Exponent is 2 114
J. Håstad

Top-Down Lower Bounds for Depth 3 Circuits 124
J. Håstad, S. Jukna, and P. Pudlák

On Representations by Low-Degree Polynomials 130
R. Smolensky

Session 3a:

Chair: R. Kosaraju

A Polynomial-Time Algorithm for the Perfect Phylogeny Problem
When the Number of Character States is Fixed 140
R. Agarwala and D. Fernández-Baca

Genome Rearrangements and Sorting by Reversals 148
V. Bafna and P.A. Pevzner

Approximating Shortest Superstrings 158
S.-H. Teng and F. Yao

Session 3b:

Chair: S. Safra

On the “log rank” — Conjecture in Communication Complexity 168
R. Raz and B. Spieker

The Complexity and Distribution of Hard Problems 177
D.W. Juedes and J.H. Lutz

Sensitive Functions and Approximate Problems 186
S. Chaudhuri

Session 4a:

Chair: O. Waarts

Synchronization Power Depends on the Register Size 196
Y. Afek and G. Stupp

A Tight Lower Bound for k -Set Agreement 206
S. Chaudhuri, M. Herlihy, N.A. Lynch, and M.R. Tuttle

Session 4b:

Chair: P. Raghavan

Space Bounds for Graph Connectivity Problems on Node-Named
JAGs and Node-Ordered JAGs 218
C.K. Poon

Time-Space Lower Bounds for Directed s - t Connectivity on JAG Models 228
G. Barnes and J.A. Edmonds

A Randomized Time-Space Tradeoff of $\tilde{O}(m\hat{R})$ for USTCON 238
U. Feige

Thursday

Session 1a:

Chair: N. Megiddo

Optimally Fast Parallel Algorithms for Preprocessing and Pattern Matching in One and Two Dimensions	248
<i>R. Cole, M. Crochemore, Z. Galil, L. Gasieniec, R. Hariharan, S. Muthukrishnan, K. Park, and W. Rytter</i>	
Breaking the $\Theta(n \log^2 n)$ Barrier for Sorting with Faults.....	734
<i>T. Leighton and Y. Ma</i>	
A Linear-Processor Polylog-Time Algorithm for Shortest Paths in Planar Graphs	259
<i>P.N. Klein and S. Subramanian</i>	
Highly Efficient Asynchronous Execution of Large-Grained Parallel Programs	271
<i>Y. Aumann, Z.M. Kedem, K.V. Palem, and M.O. Rabin</i>	

Session 1b:

Chair: M. Kearns

General Bounds on Statistical Query Learning and PAC Learning with Noise via Hypothesis Boosting	282
<i>J.A. Aslam and S.E. Decatur</i>	
Scale-Sensitive Dimensions, Uniform Convergence, and Learnability	292
<i>N. Alon, S. Ben-David, N. Cesa-Bianchi, and D. Haussler</i>	
Exact Learning via the Monotone Theory.....	302
<i>N. H. Bshouty</i>	
Learning an Intersection of k Halfspaces Over a Uniform Distribution	312
<i>A. Blum and R. Kannan</i>	

Session 2a:

Chair: M. Karchmer

Primal-Dual RNC Approximation Algorithms for (Multi)-Set (Multi)-Cover and Covering Integer Programs	322
<i>S. Rajagopalan and V.V. Vazirani</i>	
Optimal Parallel All-Nearest-Neighbors Using the Well-Separated Pair Decomposition	332
<i>P.B. Callahan</i>	
Universal Emulations with Sublogarithmic Slowdown	341
<i>C. Kaklamanis, D. Krizanc, and S. Rao</i>	

Session 2b:

Chair: U. Vazirani

Quantum Circuit Complexity	352
<i>A. C.-C. Yao</i>	
A Quantum Bit Commitment Scheme Provably Unbreakable by Both Parties	362
<i>G. Brassard, C. Crépeau, R. Jozsa, and D. Langlois</i>	
Solving Systems of Set Constraints with Negated Subset Relationships	372
<i>R. Gilleron, S. Tison, and M. Tommasi</i>	

Session 3a:

Chair: E. Welzl

Near-Quadratic Bounds for the Motion Planning Problem for a Polygon in a Polygonal Environment	382
<i>D. Halperin and M. Sharir</i>	
Geometric Discrepancy Revisited	392
<i>B. Chazelle</i>	
Product Range Spaces, Sensitive Sampling, and Derandomization	400
<i>H. Brönnimann, B. Chazelle, and J. Matoušek</i>	

Session 3b:

Chair: D. Kozen

The Complexity of the Theory of p -adic Numbers.....	412
<i>L. Egidi</i>	
Testing Equalities of Multiplicative Representations in Polynomial Time	422
<i>G. Ge</i>	
Las Vegas Algorithms for Matrix Groups	427
<i>R. Beals and L. Babai</i>	

Session 4a:

Chair: N. Megiddo

Faster Algorithms for the Generalized Network Flow Problem	438
<i>T. Radzik</i>	
A Framework for Cost-Scaling Algorithms for Submodular Flow Problems	449
<i>H.N. Gabow</i>	
A Simple Local-Control Approximation Algorithm for Multicommodity Flow	459
<i>B. Awerbuch and T. Leighton</i>	

Session 4b:

Chair: M. Karchmer

Dynamic Word Problems	470
<i>G.S. Frandsen, P.B. Miltersen, and S. Skyum</i>	
Optimal Bi-Weighted Binary Trees and the Complexity of Maintaining Partial Sums	480
<i>H. Hampapuram and M.L. Fredman</i>	
†A Weak Version of the Blum, Shub and Smale Model	486
<i>P. Koiran</i>	

Friday

Session 1a:

Chair: E. Welzl

Almost Tight Upper Bounds for Lower Envelopes in Higher Dimensions	498
<i>M. Sharir</i>	

Efficient Computation of Euclidean Shortest Paths in the Plane.....	508
<i>J. Hershberger and S. Suri</i>	
The Union of Convex Polyhedra in Three Dimensions.....	518
<i>B. Aronov and M. Sharir</i>	
Better Lower Bounds on Detecting Affine and Spherical Degeneracies.....	528
<i>J. Erickson and R. Seidel</i>	
Session 1b:	
Chair: S. Safra	
The Hardness of Approximate Optima in Lattices, Codes, and Systems of Linear Equations.....	724
<i>S. Arora, L. Babai, J. Stern, and Z. Sweedyk</i>	
When Can We Sort In $o(n \log n)$ Time?.....	538
<i>A.M. Ben-Amram and Z. Galil</i>	
On Bounded Queries and Approximation.....	547
<i>R. Chang and W.I. Gasarch</i>	
The NC Equivalence of Planar Integer Linear Programming and Euclidean GCD.....	557
<i>D. Shallcross, V. Pan, and Y. Lin-Kriz</i>	
Session 2a:	
Chair: D. Eppstein	
A Polynomial Time Algorithm for Counting Integral Points in Polyhedra When the Dimension is Fixed.....	566
<i>A.I. Barvinok</i>	
A Compact Piecewise-Linear Voronoi Diagram for Convex Sites in the Plane.....	573
<i>M. McAllister, D. Kirkpatrick, and J. Snoeyink</i>	
Refining a Triangulation of a Planar Straight-Line Graph to Eliminate Large Angles.....	583
<i>S.A. Mitchell</i>	
Session 2b:	
Chair: U. Vazirani	
Signal Propagation, with Application to a Lower Bound on the Depth of Noisy Formulas.....	594
<i>W. Evans and L.J. Schulman</i>	
Directed vs. Undirected Monotone Contact Networks for Threshold Functions.....	604
<i>M.M. Halldórsson, J. Radhakrishnan, and K.V. Subrahmanyam</i>	
Session 3a:	
Chair: D. Kozen	
Counting Rational Points on Curves Over Finite Fields.....	616
<i>M.-D. Huang and D. Ierardi</i>	
An $O(n \log^3 n)$ Algorithm for the Real Root Problem.....	626
<i>J.H. Reif</i>	

Session 3b:

Chair: O. Waarts

Near-Linear Cost Sequential and Distributed Constructions of Sparse Neighborhood Covers.....	638
<i>B. Awerbuch, B. Berger, L. Cowen, and D. Peleg</i>	
Fast Algorithms for Constructing t -Spanners and Paths with Stretch t	648
<i>E. Cohen</i>	
A Sub-Linear Time Distributed Algorithm for Minimum-Weight Spanning Trees	659
<i>J.A. Garay, S. Kutten, and D. Peleg</i>	

Session 4a:

Chair: M. Kearns

Eavesdropping Games: A Graph-Theoretic Approach to Privacy in Distributed Systems	670
<i>M. Franklin, Z. Galil, and M. Yung</i>	
A Chernoff Bound for Random Walks on Expander Graphs	680
<i>D. Gillman</i>	
On Choosing a Dense Subgraph.....	692
<i>G. Kortsarz and D. Peleg</i>	

Session 4b:

Chair: R. Motwani

Efficient Out-of-Core Algorithms for Linear Relaxation Using Blocking Covers.....	704
<i>C.E. Leiserson, S. Rao, and S. Toledo</i>	
External-Memory Computational Geometry.....	714
<i>M.T. Goodrich, J.-J. Tsay, D.E. Vengroff, and J.S. Vitter</i>	

Author Index	744
---------------------------	-----

† Winner of the Machtey Award for the best student-authored paper.