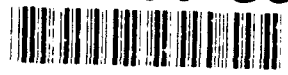


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# Complexity Issues in Numerical Optimization: Final Report

Stephen A. Vavasis  
Computer Science Department  
Cornell University

September 17, 1991

A conference on complexity issues in numerical optimization was held in Ithaca, NY on March 22-23, 1991. The conference featured 17 invited speakers, each of whom gave a 45 minute presentation. The conference was supported primarily by the Air Force Office of Scientific Research, with additional support from the Cornell Mathematical Sciences Institute and SIAM. The organizers were Panos Pardalos of Pennsylvania State University (now at University of Florida) and me. Approximately 25 people attended the workshop in addition to the speakers.

The speakers and their titles were as follows:

- I. Adler, Berkeley, Strongly polynomial algorithms for linear programs with algebraic coefficients.
- D. Du, Princeton, New results for the Steiner tree problem.
- R. Freund, MIT, Complexity results for following the center of a linear inequality system as the data is parametrically deformed.
- N. Karmarkar, A T & T Bell Laboratories, Continuous methods for inductive inference problems.
- V. Klee, Washington, Computational complexity of inner and outer  $j$ -radii.
- N. Megiddo, IBM Almaden, Parallel complexity of linear programming.
- K. Murty, Michigan, New iterative methods for linear inequalities.

- P. Pardalos, Penn State, Complexity issues in nonconvex network flow problems.
- J. Renegar, Cornell, Is it possible to know a problem is ill-posed?
- N. Shor, Kiev, Simple algorithms for constructing inscribed and outscribed optimal ellipsoids.
- E. Tardos, Cornell, Computing approximate Lagrangean relaxations for packing problems.
- M. Todd, Cornell, The low complexity algorithm for linear programming is a path following method.
- C. Tovey, Georgia Tech, Shrinking the yolk in spatial voting games.
- P. Vaidya, Illinois, Solving linear equations with symmetric diagonally dominant matrices by constructing good preconditioners.
- S. Vavasis, Cornell, Approximation algorithms for indefinite quadratic programming.
- G. Wasilkowski, Kentucky, On average complexity of an unconstrained optimization problem.
- Y. Ye, Iowa, On combining a globally convergent method with Newton's method.

Two of the speakers, Tardos and Karmarkar, were also plenary speakers at the international ICIAM meeting in the summer of '91. The meeting ended with an open problem session, in which a number of interesting problems in the field were proposed.

The meeting was written up in *SIAM News* during the summer of 1991. A formal volume of proceedings for the meeting is in progress. This volume will take the form of a special issue of *Mathematical Programming*, a widely read international journal in the field. Panos Pardalos and I are editing the proceedings.

All the speakers were reimbursed for there expenses out of the conference budget, and all the other expenses for the meeting (except costs associated with distributing copies of the proceedings) have been settled.



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