Final Report:

April 6, 2001

SIAM Conference on
Linear Algebra and Its Applications
October 23-26, 2000

The Society for Industrial and Applied Mathematics (SIAM) and the SIAM Activity Group in Linear Algebra in conjunction with the International Linear Algebra Society (ILAS) held the SIAM Conference on Linear Algebra and its applications on October 23-26, 2000 at the McKimmon Conference Center on the campus of North Carolina State University in Raleigh, North Carolina.

The goals of this conference were to highlight the central role of linear algebra in many problems of mathematics and the applied sciences, including engineering problems in systems and control, signal processing and coding, economic and business problems, and problems from biology and geophysics.

Particular consideration in this conference was given to applications in image processing, information retrieval and management (such as the performance of search engines on the Internet), aircraft manufacturing and design, industrial optimization problems, and assessing the economic cost of linear algebra in industry.

With the development of high performance computers and new parallel architectures, computational linear algebra is in a state of rapid development. There are grand challenges requiring the development of efficient methods that solve truly large-scale problems by exploiting the ever-increasing computational power. One of the primary goals of this conference was to bring researchers and practitioners in these various areas together for exchange of information and ideas. In particular, the collaboration with ILAS was an important factor in bringing about fruitful interaction among researchers in theory, computation, and applications. There were 250 total attendees with 17% coming from industry and government. In addition, there were 27 students who attended.

CONFERENCE PROGRAM

The conference program was very successful. SIAM requests evaluations from the conference attendees. Of the evaluations received from attendees, 94% rated the program good to excellent.

The final program is archived on the SIAM website at www.siam.org/meetings/la00/. We highlight here some of the significant sessions.

Invited Plenary Presentations

Matrix Computations

Gene H. Golub, Stanford University, USA

Displacement Structure: from Theory to Applications

Thomas Kailath, Stanford University, USA

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Invited Plenary Presentations (continued)

Jordan and Kronecker Structures of Perturbed Operators and Pencils
Eduardo Marques de Sá, University of Coimbra, Portugal

Random Perturbations of Familiar Matrices
Gilbert Strang, Massachusetts Institute of Technology, USA

The Ubiquitous Kroneker Product
Charles F. Van Loan, Cornell University, USA

Gerschgorin Circles, Cassini Ovals, and the Brualdi Set for Eigenvalue
Inclusion Regions in the Complex Plane
Richard S. Varga, Kent State University, USA

Moment Problems
Hugo J. Woerdeman, The College of William and Mary, USA

Structure, Sensitivity, and Semi-solutions: Linear Algebra in Optimization
Margaret H. Wright, Bell Laboratories, Lucent Technologies, USA

Invited Concurrent Presentations

Linear and Nonlinear Algebra Problems Arising in PDE Imaging
Tony F. Chan, University of California, Los Angeles, USA

Impact of Computer Architectures on Linear Algebra Algorithms
Jack J. Dongarra, University of Tennessee, Knoxville and Oak Ridge
National Laboratory, USA

Conditionally Positive Definite Matrices
Roger Horn, University of Utah, USA

Cruising (approximately) at 41,000 feet -- Iterative Methods at Boeing
John G. Lewis, The Boeing Company, USA

Numerical Solution of Large Sparse Quadratic Eigenvalue Problems
Volker Mehrmann, University of Chemnitz, Germany

The Linear Algebra of Image Processing
Dianne P. O'Leary, University of Maryland, College Park, USA

Error Estimation in Iterative Methods
Lothar Reichel, Kent State University, USA

Invited Concurrent Presentations (continued)

Componentwise and Structured Perturbations
Siegfried M. Rump, Technical University of Hamburg, Germany

Convex Optimization over Positive Polynomials and Polynomial Matrices
Paul M. Van Dooren, Université Catholique de Louvain, Belgium

Minisymposia

Approximation of Large-scale Dynamical Systems
A. C. Antoulas, Rice University, USA

Recent Developments in Approximate Inverse Preconditioning
Michele Benzi, Los Alamos National Laboratory, USA

Algorithms for Information Retrieval and Management
Michael W. Berry, University of Tennessee, Knoxville, USA

Direct Methods for Solving Linear Systems
James W. Demmel, University of California, Berkeley, USA

Matrix Computations in Image Processing
James G. Nagy, Emory University, USA

Totally Nonnegative Matrices I, II
Charles R. Johnson, The College of William and Mary, USA

Linear Algebra, What's it Worth?
Daniel J. Pierce, The Boeing Company, USA

Invariant Subspaces
Henk A. Van der Vorst, Utrecht University, The Netherlands

Report Submitted by:

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SIAM
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