

**Conference at Northern Illinois University: NIU
LA'09**

**Linear and Numerical Linear Algebra: Theory,
Methods, and Applications**

August 12–14, 2009

CONFERENCE PROGRAM

Conference Venue: NIU Holmes Student Center (HSC). All plenary sessions will be held in the Diversions Multi-Purpose Room on the Ground Floor of HSC. Parallel sessions will also use the Heritage Rooms and the Illinois Room on the second floor of HSC.

Wednesday, August 12, 2009

7:30 am Registration Opens (Diversions Room Ground floor of HSC)
8:30 am Introduction and Welcoming Remarks
Biswa Datta, Dean Chris McCord, Vice President James Erman, and Chair William Blair (Diversions)

9 am **KEY-NOTE TALK** (Diversions) Chair: Biswa Datta
Hans Schneider, *Visualization in max algebra: An application of diagonal scaling of matrices*

9:40 am Tea/Coffee

Session on Matrix Theory and Applications (Diversions) Chairs: Y. Hong and Brian Shader

10 am **Charles R. Johnson**, *Computation of Equilibriants for Semi-positive Matrices*

10:30 am **Tom Laffey**, *Constructing Nonnegative Matrices With Given Nonzero Spectrum*

11:00 am **Michael Neumann**, *On the connections between the inverse M-matrix problem and the inverse mean first passage matrix problem for Markov chains*

11:30 am **Dale Olesky**, *M_{\vee} -matrices: A generalization of M-matrices based on eventually nonnegative matrices*

12:00 pm **Vadim Olshevsky**, *A quasiseparable approach to CMV and Fiedler matrices*

12: 30 LUNCH

Session on Optimization (Diversions)

Chairs: Sien Deng and Floyd Hanson

2 pm **William Hager**, *Direct Trajectory Optimization and Costate Estimation of General Optimal Control Problems Using a Radau Pseudospectral Method*

2:30 pm **Jorge Moré**, *Estimating Computational Noise in Simulation-Based Optimization Problems*

3:00 pm **Henry Wolkowicz**, *Explicit Sensor Network Localization using Semidefinite Programming and Clique Reductions*

3:40 pm **Biswa Datta**, *Computational and Optimization Methods for Inverse Eigenvalue Problems in Active Vibration Control and Finite Element Model Updating*

4:10 pm Tea/Coffee

Session on Numerical Linear Algebra and Applications (Diversions)

Chair: Vadim Olshevsky

4:30 pm **Robert Plemmons**, *Tensor and Segmentation Methods for Hyperspectral Unmixing*

5:00 pm **James Nagy**, *Efficient Iterative Methods for Large Scale Inverse Problems*

5:30 pm **John Gilbert**, *Challenges in Combinatorial Scientific Computing*

6 pm **Venkataramanan Balakrishnan**, *A Parallel Direct Solver for the Simulation of Large-scale Power/Ground Networks*

6:30–7:30 **Reception** (HSC Ellington Room)

Thursday, August 13

Session on Inverse Problems (Diversions)

Chairs: Karabi Datta and Kumar Singh

- 8:30 am **John Mottershead**, *A Receptance Method for Active Pole Placement in Structures: Sensitivity, Partial Pole Placement and Robustness*
- 9:10 **Yoram Halevi**, *Connectivity Constrained Reference Basis Model Updating*
- 9:40 **Vadim Sokolov**, *A New Hybrid Method for the Quadratic Affine Inverse Eigenvalue Problem*
- 10:10 am Tea/Coffee

Session on Control and Systems (Diversions)

Chair: Biswa Datta

- 10:30 am **Shankar Bhattacharyya**, *Robust Control via Sign Definite Decomposition*
- 11:00 am **Floyd Hanson**, *Stochastic-Volatility, Jump-Diffusion Optimal Portfolio Problem with Jump-Bankruptcy Condition*
- 11:30 am **Kumar V. Singh**, *Partial Spectrum Assignment in a Time Delayed System for Active Vibration Control*
- 12 pm **B. Ross Barmish**, *On Positivity of Multivariate Polynomials*

12:30 **Group Picture** (Location TBA)

12:45 - 2 pm LUNCH

Session on Matrices and Graphs

(Diversions) Chair: Charles R. Johnson

- 2:00 pm **Richard Brualdi**, *Eigenvalues of Digraphs, with emphasis on the spectral radius: A Survey*
- 2:40 pm **Bryan Shader**, *Expected values of parameters associated with the minimum rank of a graph*
- 3:20 pm **Avi Berman**, *Graphs and Matrices*

4pm TEA/COFFEE

Thursday, August 13 (continued)

Parallel Sessions

Special Session I: Linear Algebra Education (Diversions)

Chair: Karabi Datta

- 4:20 pm **Steve Leon**, *Linear Algebra Education Reform: Accomplishments of the Past and Challenges for the Future*
- 4:50 pm **Ronald Taylor**, *Implementing Numerical Linear Algebra in the Undergraduate Science and Engineering Curriculum*
- 5:20 pm **Avi Berman**, *Multiple Proofs and Motivating Examples in Teaching Linear Algebra*
- 5:50 pm **Eric Stahlberg**, *TBA*
-

Special Session II (Heritage North)

Chair: Vadim Sokolov

- 4:20 pm **Yoram Halevi**, *Can Any Reduced Order Model Be Obtained Via Projection?*
- 4:50 pm **In-Jae Kim**, *Compressed Sensing and Matrix Problems*
- 5:20 pm **Roummel Marcia**, *Compressive Sensing Matrices and Coded Aperture Imaging*
- 5:50 pm **Ying Wai (Daniel) Fan**, *Synthetic Boundary Conditions, Coordinate Transformations and Preconditioning for Image Deblurring Problems*
-

Special Session III (Heritage South)

Chairs: V. Balakrishnan and Z. Zeng

- 4:20 pm **Hongchao Zhang**, *A Derivative-Free Algorithm for the Least-Square Minimization*
- 4:50 pm **Qinghong Zhang**, *Linear Programming over Cones and Linear Semi-infinite Programming*
- 5:20 pm **Hongbin Guo**, *Error analysis for least squares with monotonical data*
- 5:50 pm **Carl Jagels**, *The Extended Krylov Subspace Method and Orthogonal Laurent Polynomials*
-

Special Session IV (Illinois)

Chairs: Karabi Datta and V. Olshevsky

- 4:20 pm **Fuzhen Zhang**, *Contractions and Hua Matrices*
- 4:50 pm **Tom Bella**, *Arbitrary order Hessenberg-quasiseparable matrices and polynomials*
- 5:20 pm **Mohan Thapa**, *A New Hybrid Method for Finding Eigenpairs of a Symmetric Quadratic Eigenvalue Problem in an Interval*
- 5:50 pm **Jianlin Xia**, *A stable and highly efficient superfast Toeplitz solver*
-

- 7:30 pm - 10:30 pm **Conference Banquet** (Sky Room of HSC)
MC for the Banquet - William Blair;
Banquet Speakers - TBA

Friday, August 14

Session on Matrices, Tensors, and Quaternions (Diversions)

Chair: Richard Brualdi

- 8:30 am **Fuzhen Zhang**, *Colorful Quaternions*
9:00 am **Alan Edelman**, *Linear Algebra with 'Ghosts and Shadows'*
9:30 am **Shmuel Friedland**, *Results and problems for 3-tensors*
-

10:10 am Tea/Coffee

Session on Matrices and Differential Equations (Diversions)

Chair: Biswa Datta

- 10:30 am **Anton Zettl**, *Matrix Representations of Sturm-Liouville Problems with Finite Spectrum*
11:00 am **Steve Campbell**, *Stabilized completions of general differential algebraic equations*
11:30 **William Trench**, *On nonautonomous linear systems of differential and difference equations with R -symmetric coefficient matrices*
-

Session on Numerical Linear Algebra (Diversions)

Chairs: Robert Plemmons and James Nagy

- 12:00 pm **Shiv Chandrasekaran**, *Banishing Runge, Avoiding Gibbs*
12:30 pm **Paul Saylor**, *A Subsolution Method for the Scattering Amplitude*
1:00 pm **Zhonggang Zeng**, *Matrix Computation in Numerical Polynomial Algebra and Algebraic Geometry*
-

1:40 pm **Concluding Remarks and Conference Adjournment**

On Friday, August 14, packed lunches will be available to the participants starting at noon outside the Diversions Room.

Shuttles to O'Hare Airport will leave the campus at 2 pm and at 3 pm.