

**THE SIXTH
INTERNATIONAL
CONFERENCE
ON NUMERICAL ALGEBRA
AND
SCIENTIFIC COMPUTING
(NASC 2016)**

(<http://lsec.cc.ac.cn/~NASCNAG/>)

**School of Mathematical Sciences
Zhejiang University
Hangzhou, P.R. China
October 22–26, 2016**

NASC is an international conference organized by the *Chinese numerical algebra group* (**CNAG**), and run by *Academy of Mathematics and Systems Science* (**AMSS**), *Chinese Academy of Sciences* (**CAS**), starting from 2006. The conference highlights recent advances in theoretical, computational and practical aspects of linear and nonlinear numerical algebra. The aim of the conference is to gather numerical algebra and scientific computing experts to exchange ideas and discuss future developments and trends of these closely related fields.

The topics of NASC 2016 include, but are not limited to: solutions of linear and nonlinear equations; solutions of least-squares problems; structured iterative methods for linear and nonlinear matrix equations; computations of eigenvalue problems; tensor decompositions and computations; parallel computations; constructions and analyses of algebraic and physical-based preconditioners; methods and theories of structured matrices; and applications of numerical algebraic techniques and algorithms.

An important event during the conference is the award of the *Applied Numerical Algebra* (**ANA**) Prize which is awarded to at most two best papers by young Chinese scientists working on numerical algebra and scientific computing.

SPONSORSHIP:

Zhejiang University

Academy of Mathematics and Systems Science, CAS

Chinese Academy of Sciences

Hangzhou Normal University

National Natural Science Foundation of China

The Chinese Mathematical Society

Zhejiang Gongshang University

PROGRAM

OCTOBER 21 (FRIDAY) REGISTRATION and RECEPTION

15:00-17:30 REGISTRATION

Place: In the Lobby of the Participant's Living Hotel

- Zhejiang Hotel

No. 278, San-Tai-Shan Road

The West Lake District, Hangzhou

Tel.: +86-571-87180808

- Sunday Sunney Resort

No. 200, San-Tai-Shan Road

The West Lake District, Hangzhou

+86-571-87975888, -87620352, -87620353

18:00- RECEPTION DINNER

Place: Sunday Sunney Resort

The Restaurant on The Second Floor

LECTURE VENUES:

October 22-25: The Osmanthus Room
 The First Floor of The VIP Building
 Zhejiang Hotel

OCTOBER 22 (SATURDAY)

OPENING CEREMONY and LECTURES

- 9:00-9:20 OPENING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 9:20-9:40 GROUP PHOTO
- 9:40-11:10 INVITED TALKS Chairperson: **Zhong-Ci Shi**
- 9:40-10:25 **L. Eldén**: Solving Bilinear Tensor Least Squares Problems
- 10:25-11:10 **P.S. Vassilevski**: Spectral Upscaling for Graph Laplacian Problems
- 11:10-11:20 TEA BREAK
- 11:20-12:10 ANA PRIZE SESSION Chairperson: **Hua Dai**
- 11:20-11:45 **Candidate A: Z.-R. Ren**: On Structured Preconditioning Methods for Sinc Systems of Linear Third-Order Ordinary Differential Equations
- 11:45-12:10 **Candidate B: J.-L. Zhang**: A New Relaxed PSS Preconditioner for Nonsymmetric Saddle Point Problems
- 12:20-14:00 LUNCH (Lilac Cafe, Zhejiang Hotel)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Wen-Wei Lin**
- 14:30-15:00 **A. Ramage**: Preconditioners in Liquid Crystal Modelling
- 15:00-15:30 **M. Rozloznik**: J-Orthogonal Matrices and Their Sign Patterns
- 15:30-16:00 **Z.-Q. Wang**: Block Alternative Implicit Iteration Methods for Generalized Saddle-Point Problems
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Miro Rozloznik**
- 16:20-16:50 **E.K. Chu**: Doubling and Rational Krylov Projection Methods for Algebraic Riccati Equations
- 16:50-17:20 **T.-M. Huang**: Structure-Preserving Methods with Nonequivalence Deflation for a Large Sparse Nonlinear Matrix Equation Arising in Nano Research
- 17:20-17:50 **H.-B. An**: Anderson Acceleration and Application to Three Temperature Energy Equations
- 18:00-20:00 DINNER
Place: Lilac Cafe, Zhejiang Hotel
The Second Floor of The Main Building
- 20:30- **SELECTION of APPL. NUMER. ALGEBRA PRIZE**
Place: Sunday Sunney Resort
The Meeting Room on The Second Floor
Panel Chairs: I.S. Duff, V. Mehrmann, Z.-C. Shi

OCTOBER 23 (SUNDAY)

LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Iain S. Duff**
- 9:00-9:45 **V. Mehrmann**: Linear Port-Hamiltonian Systems
- 9:45-10:30 **J.G. Nagy**: Iterative Regularization Tools: A MATLAB Package for Large Scale Inverse Problems
- 10:30-10:40 TEA BREAK
- 10:40-12:10 INVITED TALKS Chairperson: **Alison Ramage**
- 10:40-11:25 **A. Frommer**: Analysis of Arnoldi-Type Methods for Computing Matrix Functions
- 11:25-12:10 **C.-H. Guo**: Newton-Noda Iteration for Finding the Perron Pair of a Weakly Irreducible Nonnegative Tensor
- 12:20-14:00 LUNCH (Lilac Cafe, Zhejiang Hotel)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Zeng-Qi Wang**
- 14:30-15:00 **I.S. Duff**: Sparse Direct Solution on Parallel Computers
- 15:00-15:30 **G. Wu**: A New Method for Computing ϕ -Functions of Large Sparse and Low-Rank Matrices with Applications
- 15:30-16:00 **X.-P. Guo**: On the Accelerated Iterative Method for Systems of Nonlinear Equations
- 16:00-16:20 TEA BREAK
- 16:20-17:20 CONTRIBUTED TALKS Chairperson: **Jun-Gong Xue**
- 16:20-16:50 **Q.-W. Wang**: Sylvester-Type Matrix Equations and Simultaneous Decompositions for Some Sets of Matrices
- 16:50-17:20 **L.-L. Zhang**: On Convergence of Modulus-Based Matrix Splitting Iteration Method for Linear Complementarity Problems
- 18:30-20:00 CONFERENCE DINNER of NASC 2016
(Including Issue of the Prize)
- Place:** Kun-Lun Vacation Village Hotel
Add: No. 3, Longjing Road, The West Lake District, Hangzhou
Tel: +86-571-87959777

OCTOBER 23 (SUNDAY)

POSTER SESSION

9:00-17:50 POSTER SESSION

- C.-R. Chen:** On Modified Generalized Shift-Splitting Preconditioners for Singular Nonsymmetric Saddle Point Problems
- Y.-X. Dong:** On Generalized PMHSS Iterations for Continuous Sylvester Equations
- Y.-F. Ke:** A New Alternating Positive Semidefinite Splitting Preconditioner for Saddle Point Problems from Time-Harmonic Eddy Current
- L.-D. Liao:** A Relaxed Alternating Preconditioner for Nonsymmetric Saddle Point Problems from Steady Navier-Stokes Equations
- C.-Q. Miao:** A Filtered-Davidson Method for Large Symmetric Eigenvalue Problems
- X.-H. Shao:** A Modified Preconditioner for Parameterized Inexact Uzawa Method on Indefinite Saddle Point Problems
- Y.-J. Xie:** An Accelerated Newton Method of High-Order Convergence for Solving a Class of Weakly Nonlinear Complementarity Problems
- W.-R. Xu:** Procrustes Problems and Inverse Eigenproblems for Multilevel Block α -Circulants
- X. Yang:** On the Stopping Tolerances of the Inner Iteration in Inexact Matrix Splitting Iteration Methods

OCTOBER 24 (MONDAY)

LECTURES

- 9:00-10:30 INVITED TALKS Chairperson: **Dan-Fu Han**
- 9:00-9:45 **F.-S. Bai**: Dimensionality Reduction for Big Data
- 9:45-10:30 **J.-F. Yin**: Modulus-Based Matrix Splitting Iteration Methods for the Complementarity Problems
- 10:30-10:40 TEA BREAK
- 10:40-12:10 CONTRIBUTED TALKS Chairperson: **Bo Yu**
- 10:40-11:10 **T.-X. Li**: A Symmetric Structure-Preserving QR Algorithm for Linear Response Eigenvalue Problems
- 11:10-11:40 **Z.-J. Bai**: Semidefinite Inverse Eigenvalue Problems with Prescribed Entries and Partial Eigendata
- 11:40-12:10 **Z.-G. Jia**: The Model Updating Problem for Gyroscopic System with No Spill-Over
- 12:20-14:00 LUNCH (Lilac Cafe, Zhejiang Hotel)
- 14:30-16:00 CONTRIBUTED TALKS Chairperson: **Eric King-wah Chu**
- 14:30-15:00 **B. Yu**: FE-ADMM Algorithms for Elliptic Optimal Control Problems
- 15:00-15:30 **R.-P. Wen**: A Manifold-Approximating Algorithm for Matrix Completion
- 15:30-16:00 **Y. Cao**: Block Triangular Preconditioners Based on Symmetric-Triangular Decomposition for Generalized Saddle Point Problems
- 16:00-16:20 TEA BREAK
- 16:20-17:50 CONTRIBUTED TALKS Chairperson: **Yu-Mei Huang**
- 16:20-16:50 **Y.-H. Ran**: On Preconditioners for the Space Fractional Coupled Nonlinear Schroedinger Equations
- 16:50-17:20 **Y.-F. Jing**: Development on Block Iterative Methods for Linear Systems with Multiple Right-Hand Sides
- 17:20-17:50 **X. Wang**: SOR-Like Method and GAOR Method for Generalized Saddle Point Problems
- 18:00-20:00 DINNER
Place: Lilac Cafe, Zhejiang Hotel
The Second Floor of The Main Building

OCTOBER 24 (MONDAY)

POSTER SESSION

9:00-17:50 POSTER SESSION

- Y.-R. Fu:** A Modified Optimal Low-Rank Matrix Approximation Algorithm for Toeplitz Matrix Completion
- X.-M. Gu:** ESTC-Math Test Matrix Library: Linear Systems and Eigenvalue Computations
- X.-X. Guo:** The Existence Condition and Numerical Methods of the Extremal Solutions for Complex Nonsymmetric Algebraic Riccati Equations
- G.-X. Huang:** A Half-Quadratic and Generalized Krylov Subspace Based Anisotropic l_p ($0 < p < 1$)-TV Regularization for Image Restoration
- S.-X. Miao:** A Shift Splitting Preconditioner for Implicit Runge-Kutta Discretizations of a Partial Differential-Algebraic Equation
- H.-D. Wang:** On the Construction and the Convergence of APIU-Like and SSOR-Like Methods
- A.-B. Xu:** Iterative Optimal Solutions for Solvable and Unsolvable Inhomogeneous Linear Matrix Equations of Sylvester and Lyapunov Type
- H.-X. Zhong:** Weighted Golub-Kahan-Lanczos Algorithms and Applications
- S.-X. Zhu:** Computing Log Determinant and Its Derivatives

OCTOBER 25 (TUESDAY)

LECTURES

- 9:00-10:30 CONTRIBUTED TALKS Chairperson: **Jian-Yu Pan**
- 9:00-9:30 **J.-J. Zhang:** A Scaled Gradient Method for Polyenergetic X-Ray Computerized Tomography Image Reconstruction with Multi-Material Decomposition
- 9:30-10:00 **A.-L. Yang:** Minimum Residual Hermitian and Skew-Hermitian Splitting Iteration Methods for Non-Hermitian Positive Definite Linear Systems
- 10:00-10:30 **N.-M. Zhang:** On the Iteration Methods for Solving Singular Linear Systems
- 10:30-10:40 TEA BREAK
- 10:40-12:10 CONTRIBUTED TALKS Chairperson: **Qing-Wen Wang**
- 10:40-11:10 **B.L. Krukier:** On Some Properties of Matrices Obtained by Approximating Stationary Convection-Diffusion-Reaction Equation
- 11:10-11:40 **T.S. Martynova:** Influence of the Form of Convection-Diffusion Equation on Convergence of the Successive Over-Relaxation Method
- 11:40-12:10 **Z.-Y. Liu:** Trigonometric Transform Splitting Methods for Real Symmetric Positive Definite Toeplitz Systems
- 12:20-14:00 LUNCH (Lilac Cafe, Zhejiang Hotel)
- 14:30-15:30 CONTRIBUTED TALKS Chairperson: **Tatiana S. Martynova**
- 14:30-15:00 **X.-F. Duan:** Numerical Methods for Solving Some Matrix Feasibility Problems
- 15:00-15:30 **Y.-W. Wen:** A Semi-Smooth Newton Method for Uniform Noise Removal with L_∞ -Norm Constraint
- 15:30-16:00 CLOSING CEREMONY Chairperson: **Zhong-Zhi Bai**
- 16:20-17:50 ROUND TABLE DISCUSSION IN CHINESE
- 18:00-20:00 DINNER
Place: Lilac Cafe, Zhejiang Hotel
The Second Floor of The Main Building

OCTOBER 26 (WEDNESDAY)

EXCURSION

9:00-17:30 EXCURSION (Self-Serviced and Self-Guided Excursion)

18:00-20:00 DINNER

Place: Lilac Cafe, Zhejiang Hotel
The Second Floor of The Main Building

BRIEF HISTORY OF NASC:

NASC 2006: AMSS, Beijing, October 22–25

Co-Chairs: Raymond H. Chan and Zhong-Ci Shi

Special Issue: Journal of Computational and Applied Mathematics, 226:1(2009)

Special Issue Editors: Zhong-Zhi Bai, Lothar Reichel and Zhong-Ci Shi

NASC 2008: Nanjing Normal University, Nanjing, November 2-5

Co-Chairs: Iain S. Duff and Zhong-Ci Shi

Special Issue: Linear Algebra and Its Applications, 434:11(2011)

Special Issue Editors: Zhong-Zhi Bai, Michele Benzi, Iain S. Duff, Andreas Frommer and Zhong-Ci Shi

NASC 2010: AMSS, Beijing, October 23–27

Co-Chairs: Martin H. Gutknecht and Zhong-Ci Shi

Special Issue: Numerical Linear Algebra with Applications, 19:6(2012)

Special Issue Editors: Zhong-Zhi Bai, Iain S. Duff, Lothar Reichel and Zhong-Ci Shi

NASC 2012: Dalian University of Technology, Dalian, October 20–24

Co-Chairs: Lev A. Krukier and Zhong-Ci Shi

Special Issue: Journal of Engineering Mathematics, 89:1(2014)

Special Issue Editors: Zhong-Zhi Bai and Iain S. Duff

NASC 2014: Tongji University, Shanghai, October 25–29

Special Issue: BIT Numerical Mathematics, 56:2(2016)

Special Issue Editors: Zhong-Zhi Bai and Lothar Reichel

NASC 2016: Zhejiang University, Hangzhou, October 22–26

Special Issue: Numerical Linear Algebra with Applications, vol:no(2017)

Special Issue Editors: Zhong-Zhi Bai, Maya G. Neytcheva and Lothar Reichel

BRIEF HISTORY OF ANA PRIZE WINNERS:

NASC 2006: Heng-Bin An

NASC 2008: Zheng-Jian Bai

NASC 2010: Jun-Feng Yin

NASC 2012: Bo Dong and Lei-Hong Zhang

NASC 2014: Yang Cao and Chang-Li Liu

BRIEF HISTORY OF ANA PRIZE COMMITTEE:

NASC 2006

Advisory Board: Iain S. Duff Gene H. Golub Zhong-Ci Shi

Members:

Feng-Shan Bai	Zhao-Jun Bai	Hua Dai	Iain S. Duff
Gene H. Golub	Martin H. Gutknecht	Ken Hayami	Lev A. Krukier
Tian-Gang Lei	Xing-Ping Liu	Wen Li	Lin-Zhang Lu
Shu-Fang Xu	Zhong-Ci Shi	Yang-Feng Su	

NASC 2008

Advisory Board: Iain S. Duff Zhong-Ci Shi Andrew J. Wathen

Members:

Zhong-Zhi Bai	Iain S. Duff	Ken Hayami	Volker Mehrmann
Zhong-Ci Shi	Yong-Zhong Song	Andrew J. Wathen	

NASC 2010

Advisory Board: Iain S. Duff Martin H. Gutknecht Zhong-Ci Shi

Members:

Raymond H. Chan	Iain S. Duff	Martin H. Gutknecht	Er-Xiong Jiang
Lev A. Krukier	Lothar Reichel	Zhong-Ci Shi	Yong-Zhong Song
Andrew J. Wathen			

NASC 2012

Advisory Board: Iain S. Duff Lev A. Krukier Zhong-Ci Shi

Members:

Hua Dai	Iain S. Duff	Ken Hayami	Lev A. Krukier
Maya G. Neytcheva	Lothar Reichel	Zhong-Ci Shi	

NASC 2014

Advisory Board: Ilse C.F. Ipsen Lothar Reichel Zhong-Ci Shi

Members:

Zhong-Zhi Bai	Hua Dai	Ken Hayami	Ilse C.F. Ipsen
Galina V. Muratova	Maya G. Neytcheva	Alison Ramage	Lothar Reichel
Miro Rozloznik	Zhong-Ci Shi	Kees Vuik	

NASC 2016

Advisory Board: Iain S. Duff Volker Mehrmann Zhong-Ci Shi

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Wen Li	Xing-Ping Liu	Volker Mehrmann	Galina V. Muratova
James G. Nagy	Maya G. Neytcheva	Alison Ramage	Miro Rozloznik
Zhong-Ci Shi	Jun-Gong Xue	Bo Yu	