Institute of mathematics & its applications

6th IMA Conference on Numerical Linear Algebra and Optimization

Wednesday 27 – Friday 29 June 2018, University of Birmingham

PROGRAMME

Wednesday 27 June

08:15	**Registration**	
08:45 – 09:00	**Welcome**	
09:00 – 09:50	**Plenary Talk:** Dominique Orban (Polytechnique Montréal) – NAG invited speaker	
	Lecture Theatre A **Minisymposium: Semidefinite programming and polynomial optimization**	**Lecture Theatre C** **Minisymposium: Grid-free Sparse Inverse Problems**
10:00 – 10:20	**Chordal decomposition in operator-splitting methods for sparse semidefinite programs** A. Papachristodoulou (Oxford, Engineering)	**Spectral Compressed Sensing via Projected Gradient Descent** K. Wei (Fudan University, Shanghai)
10:20 – 10:40	**Scalable algorithms for the non-commutative Grothendieck problem** J. Saunderson (Monash University, Australia)	**Dual certificates and recovery guarantees for the sparse superresolution problem** C. Poon (University of Cambridge)
10:40 – 11:00	**Tea/Coffee break**	
	Lecture Theatre A **Minisymposium: Semidefinite programming and polynomial optimization**	**Lecture Theatre C** **Minisymposium: Grid-free Sparse Inverse Problems**
11:00 – 11:20	**Towards a sharp degree bound for sum of squares nonnegativity certificates for quaternary quartics** D. Pasechnik (Oxford, Computer Science)	**Sparse non-negative super-resolution -- simplified and stabilized** B. Toader (University of Oxford)
11:20 – 11:40	**Semidefinite approximations of the matrix logarithm** H. Fawzi (University of Cambridge)	**Equivalence of the Conditional Gradient and Exchange Methods** A. Eftekhari (University of Edinburgh)
11:40 – 12:30	**Plenary Talk: Regularization and Compression via Tensor Dictionaries** Misha Kilmer (Tufts University)	
12:30 – 14:00	**Lunch**	
14:00 – 14:50	**Plenary Talk:** Steve Wright (University of Wisconsin) – Turing Lecture	
	Lecture Theatre A **Contributed talks**	**Lecture Theatre C** **Contributed talks**
15:00 – 15:20	**A new and simpler approach to the analysis of Robust PCA** S. Chrétien (National Physical Laboratory) and T. Wei	**Convergence of hybrid LSQR and RSVD Algorithms for ill-posed least squares problems** R. A. Renaut, Anthony Helmstetter (Arizona State University) and S. Vatankhah (University of Tehran)

15:20 – 15:40	**Fast bregman-based first-order algorithms for non-negative linear inverse problems** S. Petra (Heidelberg University)	**Minisymposium: Modern methods for least-squares fitting** **Iterative Solution of Sparse Linear Least Squares using LU Factorization** M. Baboulin (Laboratoire de Recherche en Informatique, Paris) and G. Howell (North Carolina State University)
15:40 – 16:00	**Accelerating linear systems solution by exploiting low-rank approximations to factorization error** N. J. Higham and T. Mary (University of Manchester)	**Scaling Up Gauss-Newton Methods for Expensive Least-Squares Problems** J. Fowkes and C. Cartis (University of Oxford)
16:00 – 16:20	**Tea/Coffee break**	
	Lecture Theatre A **Contributed talks**	**Lecture Theatre C** **Minisymposium: Modern methods for least-squares fitting**
16:20 – 16:40	**Advances in fitting concentric objects to digitized data** A. Al-Sharadqah (California State University Northridge)	**RALFit: A higher order nonlinear least-squares solver** T. Rees (STFC-RAL), N. Gould and J. Scott
16:40 – 17:00	**Performance bounds for co-/sparse box constrained signal recovery** J. Kuske and S. Petra	**Improving the efficiency of derivative-free methods for nonlinear least squares problems** L. Roberts (University of Oxford) C. Cartis, J. Fiala and B. Marteau
17:00 – 17:20	**Numerical methods for Lyapunov matrix equations with banded symmetric data** D. Palitta and V. Simoncini (Universitá di Bologna)	**The challenge of sparse-dense linear least-squares problems** J. Scott (STFC-RAL) and M. Taccentuma (Charles University, Czech Republic)
17:20 – 17:40	**An inner-outer iterations approach based on the Golub-Kahan bidiagonalisation for blockstructured indefinite linear systems** C. Kruse (Cerfacs), M. Arioli (Libera Universita Mediterranea), N. Tardieu (EDF R&D)	**Sparsification by stretching in linear least-squares problems** M. Taccentuma (Charles University, Czech Republic) and J. Scott (STFC-RAL)
17:40 – 18:00	**Call Center's Optimization Problem** M. Ali (University of the Witwatersrand)	**Contributed talk** **A spectrally preconditioned and initially deflated variant of the restarted block GMRES method for solving multiple right-hand sides linear systems** B. Carpentieri, S. Naveed (Free University of Bozen-Bolzano), D. Sun, T. Huang and Y. Jing (University of Electronic Science and Technology of China)
18:30 – 19:30	**Drinks Reception with canapés – Michael Tippet Building**	

Thursday 28 June

09:00 – 09:50	**Plenary Talk: High performance numerical linear algebra for the revised simplex method** Julian Hall (University of Edinburgh)	
	Lecture Theatre A **Minisymposium: tractable and scalable global optimisation and applications**	**Lecture Theatre C** **Minisymposium: Matrix Functions and Quadrature Rules with Applications to Complex Networks**
10:00 – 10:20	**Dimensionality reduction techniques for global optimization** A. Otemissov (Turing Institute and University of Oxford) and C. Cartis (University of Oxford)	**Small updates of matrix functions used for network centrality** F. Tudisco (University of Strathclyde)
10:20 – 10:40	**Manifold lifting: problems and methods** F. Goyens (Turing Institute and University of Oxford), C. Cartis (University of Oxford), A. Eftekhari (Turing Institute) and Greg Ongie (University of Michigan)	**Look-ahead Lanczos, Gauss quadrature and minimal partial realization** S. Pozza (Charles University in Prague)
10:40 – 11:00	**Tea/Coffee break**	
	Lecture Theatre A **Minisymposium: tractable and scalable global optimisation and applications**	**Lecture Theatre C** ***Minisymposium:*** **Matrix Functions and Quadrature Rules with Applications to Complex Networks**
11:00 – 11:20	**Heuristics with Performance Guarantees for the minimum number of matches problem in heat recovery network design** D. Letsios, G. Kouyialis and R. Misener (Imperial College London)	**The action of the weighted geometric mean on a vector** M. Fasi (University of Manchester)
11:20 – 11:40	**Stochastic variants of classical optimization methods, with global rates of convergence to first- and second-order critical points** C. Cartis (University of Oxford) and K. Scheinberg (Lehigh University)	**Don't walk back in anger** V. Noferini (University of Essex)
11:40 – 12:30	**Plenary Talk:** Alison Ramage (University of Strathclyde)	
12:30 – 14:00	**Lunch**	
14:00 – 14:50	**Plenary Talk – Globally Solving the Trust Region Subproblem Using Simple First-Order Methods** Amir Beck (Tel Aviv University)	
	Lecture Theatre A **Contributed talks**	**Lecture Theatre C** **Contributed talks**
15:00 – 15:20	**Shape optimization for unsteady fluid-structure interaction** J. Haubner and M. Ulbrich	**Robust preconditioning techniques for the Stokes-Darcy problem** M. Discacciati (Loughborough University)
15:20 – 15:40	**Shape Optimisation With Nearly Conformal Mappings** F. Wechsung (University of Oxford), J. A. Iglesias and K. Sturm	**Accelerating the simplex algorithm via novel crash procedures** N. Ploskas, N. V. Sahinidis, N. Samaras
15:40 – 16:00	**Using tropical optimization in rank-one approximation of positive matrices** N. Krivulin (St. Petersburg State University)	**A quadratic penalty algorithm for linear programming** I. Galabova
16:00 – 16:20	**Tea/coffee break**	

	Lecture Theatre A **Contributed talks**	**Lecture Theatre C** **Contributed talks**
16:20 – 16:40	**Superlinear convergence of the GMRES for PDE-constrained optimization problems** O. Axelsson (Institute of Geonics AS CR) and J. Karátson (ELTE University)	**Multiresolution Optimisation Algorithms: Theory and Applications** I. Sain Glibic (University of Zagreb)
16:40 – 17:00	**An efficient primal-dual interior point method for large-scale truss layout optimization problems** J. Gondzio and A. Weldeyesus (University of Edinburgh)	**Complexity guarantees and numerical behavior of Newton-type methods for smooth nonconvex optimization** M. O'Neill, C. Royer and S. Wright (University of Wisconsin-Madison)
17:00 – 17:20	**Non-diagonal dynamic regularization for Interior Point Methods** S. Pougkakiotis and J. Gondzio (University of Edinburgh)	**Adventures in Half Precision Arithmetic** P. Blanchard, T. Mary and N.Higham (University of Manchester)
17:20 – 17:40	**Acceleration and Global Convergence of a First-Order Primal–Dual Method for Nonconvex Problems** C. Clason (University Duisburg-Essen) , S. Mazurenko and T. Valkonen (University of Liverpool)	**Generalized block tuned preconditioners for SPD eigensolvers** L. Bergamaschi, Á. Martínez (University of Padua)

Friday 29 June

09:00 – 09:50	**Plenary Talk: Model-Based Methods, Sampling Models, and A New Hessian Free Second-Order Model-Based Method** Luís Nunes Vicente (University of Coimbra)	
	Lecture Theatre A **Contributed talks**	**Lecture Theatre C** **Minisymposium: Software for Numerical Linear Algebra and Optimization**
10:00 – 10:20	**Node and layer eigenvector centralities for multiplex networks** F. Arrigo, F. Tudisco (University of Strathclyde) and A. Gautier (Saarland University)	**IR Tools - A MATLAB package of Iterative Regularization Methods and Large-Scale Test Problems** J. Nagy (Emory University)
10:20 – 10:40	**A preconditioned iterative solver for efficient computational simulation of random networks of fibres** M. Houghton (University of Leeds)	**AIR Tools II - A MATLAB toolbox of algebraic iterative reconstruction methods for CT** J. Sauer Jorgensen (University of Manchester)
10:40 – 11:00	**Tea/Coffee break**	
	Lecture Theatre A **Minisymposium: Recent Advances in Low-Rank Methods**	**Lecture Theatre C** **Minisymposium: Software for Numerical Linear Algebra and Optimization**
11:00 – 11:20	J. Hook (University of Bath)	**Chordal Matrix Algorithms for Convex Optimization** M. Skovgaard Andersen (DTU Compute)
11:20 – 11:40	D. Palitta (University of Bologna)	**An object-oriented MATLAB framework for inverse problems** M. Benning (University of Cambridge)

11:40 – 12:00	**Inexact linear solves in low-rank methods for large-scale matrix equations** P. Kurschner (MPI Magdeburg)	**Minisymposium: Numerical aspects of PDE-constrained shape optimization** **Shape Optimisation with Nearly Conformal Mappings** F. Wechsung (University of Oxford)
12:00 – 12:20	**A low-rank approach to the solution of weak constraint variational data assimilation problems** M. Freitag (University of Bath)	**Multigrid algorithms for interface identification problems** M. Siebenborn (University of Trier)
12:20 – 13:20	**Lunch**	
	Lecture Theatre A **Minisymposium: Low-rank tensor methods and advanced data structures for processing high-dimensional data**	**Lecture Theatre C** **Minisymposium: Numerical aspects of PDE-constrained shape optimization**
13:20 – 13:40	**Low-rank tensor calculus in spatial statistics** A. Litvinenko, H. Rue, V. Khoromskaia, B. N. Khoromskij	**Shape optimization for unsteady fluid-structure interaction** J. Haubner
13:40 – 14:00	Mike Espig	**A robust and efficient adaptive multigrid solver for shape optimisation in cell motility** A. Madzvamuse (University of Sussex)
14:00 – 14:50	**Plenary Talk: Nonlinear Eigenvalue Problems: Classical Results and Recent Developments** Françoise Tisseur (University of Manchester)	
14:50 – 15:00	**Close of conference**	

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