



The 8th International Conference on Numerical Optimization and Numerical Linear Algebra

NOVEMBER 7-11, 2011

BEIJING, CHINA

<http://lsec.cc.ac.cn/~ICNONLA> 2011

The 8th International Conference on Numerical Optimization and Numerical Linear Algebra

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XIAMEN, FUJIAN PROVINCE, CHINA

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Sponsors

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Sightseeing Information

Information for Participants

Conference Hotel and Conference Venue

Hotel: Peony Wanpeng Hotel

厦门牡丹万鹏宾馆

Address: No.17-19 Huyuan Road, Siming District, Xiamen

厦门市思明区虎园路 17-19 号

Venue: School of Mathematical Sciences, Xiamen University

厦门大学数学科学学院

Address: No. 422, Siming South Road, Siming District, Xiamen

厦门市思明区思明南路 422 号

Arrival

By air: There is about 14.2km from Xiamen International Airport to the conference hotel. The taxi fare is about 40RMB(6.5USD c.a.). For the invited speakers, you will be picked up at the airport, if you have sent your arrival information to the organizing committee.

By train: There is about 3.8km from Xiamen railway station to the conference hotel. The taxi fare is about 12RMB(2USD c.a.). Xiamen North railway station is 30.3km away from the conference hotel. Participants who arrive at Xiamen North railway station is suggested to take an inter-city high speed train to Xiamen railway

station first (22min., 9RMB c.a.).

On-site Registration

On-site registration will take place at the hotel lobby of our conference hotel on November 6 from 9:00-21:00. If you want to register at other time, please contact our conference secretary [Ms. Ji-ping Wu](#).

Currency

Chinese currency is RMB. The current rate is about 6.34 RMB for 1 US dollar. The exchange of foreign currency can be done at the airport or the conference hotel. Please keep the receipt of the exchange so that you can change back to your own currency if you have RMB left before you leave China. Please notice that some additional processing fee will be charged if you exchange currency in China.

From Conference Hotel to Conference Venue

For participants accommodated at the conference hotel, in each morning of November 7-9, there will be a conference shuttle bus picking you up at the gate of the conference hotel to the conference venue at Xiamen University, and vice versa in the evening. The bus will leave from our conference hotel to the conference venue at 7:40 in the morning and leave for the conference hotel from the

conference venue at 18:30. For participants who don't stay in the conference hotel or miss the bus time, we are not responsible for your transportation cost.

Contact Information

If you need any help, please feel free to contact

- [Dr. Xin Liu](#): +86-138-1000-2122
- [Ms. Ji-ping Wu](#): +86-136-9106-6084 (in Chinese)

Sponsors

Academy of Mathematics and Systems Science

Center for Optimization and Applications, AMSS, CAS

Chinese Mathematical Society

Institute of Computational Mathematics and
Scientific/Engineering Computing

National Natural Science Foundation of China

School of Mathematical Sciences, Xiamen University

State Key Laboratory of Scientific and Engineering Computing

Committees

Conference Chair

Ya-xiang Yuan (Chinese Academy of Sciences, China)

Organizing Committee

Yu-hong Dai (Chinese Academy of Sciences, China)

Masao Fukushima (Kyoto University, Japan)

Ya-nan Lin (Xiamen University, China)

Xin Liu (Chinese Academy of Sciences, China)

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Qun Lin (Chinese Academy of Sciences, China)

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Conference Schedule

November 7, Monday

08:00-08:30 Opening Ceremony

08:00-08:10 Welcome Address

08:10-08:30 Group Photo

08:30-10:20 Invited Talks I1

08:30-09:30 M.J.D. Powell, The Lagrange method and SAO with bounds
on the dual variables

09:30-10:20 X.J. Chen, Regularized Least Squares Optimization for Sparse
Approximations

10:20-10:40 Coffee Break

10:40-11:30 Invited Talks I2

09:30-10:20 G. Di Pillo, An active set feasible method for large-scale mini-
mization problems with bound constraints

11:30-12:30 Contributed Talks C1

11:30-11:50 TBA, TBA

11:50-12:10 TBA, TBA

12:10-12:30 TBA, TBA

12:30-14:00 Lunch

14:00-16:00 Contributed Talks C2

14:00-14:20 TBA, TBA

14:20-14:40 TBA, TBA

14:40-15:00 TBA, TBA

15:00-15:20 TBA, TBA

15:20-15:40 TBA, TBA

15:40-16:00 TBA, TBA

16:00-16:20 Coffee Break

16:20-18:20 Contributed Talks C3

16:20-16:40 TBA, TBA

16:40-17:00 TBA, TBA

17:00-17:20 TBA, TBA

17:20-17:40 TBA, TBA

17:40-18:00 TBA, TBA

18:00-18:20 TBA, TBA

19:00 Dinner

November 8, Tuesday

08:00-10:30 Invited Talks I3

08:00-08:50 M. Fukushima, Row Action Methods for Solving L1-L2 Optimization Problems

08:50-09:40 N.H. Xiu, Some Relaxation Results on Matrix Rank Minimization Problems

09:40-10:30 C.T. Kelley, Sparse Interpolatory Reduced-Order Models for Simulation of Light-Induced Molecular Transformations

10:30-10:50 Coffee Break

10:50-12:30 Invited Talks I4

10:50-11:40 O. Burdakov, Local search for hop-constrained directed Steiner tree problem with application to UAV-based multi-target surveillance

11:40-12:30 Y.M. Wei, Condition Numbers for Moore-Penrose Inverse, Linear Least Squares, Total Least Squares, Matrix Equations and Tikhonov Regularization

12:30-14:00 Lunch

14:00-16:00 Contributed Talks C4

14:00-14:20 TBA, TBA

14:20-14:40 TBA, TBA

14:40-15:00 TBA, TBA

15:00-15:20 TBA, TBA

15:20-15:40 TBA, TBA

15:40-16:00 TBA, TBA

16:00-16:20 Coffee Break

16:20-18:20 Contributed Talks C5

16:20-16:40 TBA, TBA

16:40-17:00 TBA, TBA

17:00-17:20 TBA, TBA

17:20-17:40 TBA, TBA

17:40-18:00 TBA, TBA

18:00-18:20 TBA, TBA

19:00 Dinner

November 9, Wednesday

08:00-10:30 Invited Talks I5

08:00-08:50 **L.N. Trefethen**, Robust Rational Interpolation and Padé Approximation

08:50-09:40 **R. Chan**, Framelet-Based Algorithm for Medical Imaging Applications

09:40-10:30 **S.L. Zhang**, An Arnoldi-like approach for Generalized Eigenvalue Problems

10:30-10:50 Coffee Break

10:50-12:30 Invited Talks I6

10:50-11:40 **T. Koch**, What could a million CPUs do to solve Integer Programs?

11:40-12:30 **H.C. Zhang**, A C^0 Interior Penalty Method for the Fourth Order Obstacle Problem with Nonhomogeneous Dirichlet Boundary

12:30-14:00 Lunch

14:00-16:00 Contributed Talks C6

14:00-14:20 TBA, TBA

14:20-14:40 TBA, TBA

14:40-15:00 TBA, TBA

15:00-15:20 TBA, TBA

15:20-15:40 TBA, TBA

15:40-16:00 TBA, TBA

16:00-16:20 Coffee Break

16:20-18:20 Contributed Talks C7

16:20-16:40 TBA, TBA

16:40-17:00 TBA, TBA

17:00-17:20 TBA, TBA

17:20-17:40 TBA, TBA

17:40-18:00 TBA, TBA

18:00-18:20 TBA, TBA

18:20-18:30 Closing Ceremony

19:00 Conference Banquet

November 10, Thursday

8:00 Start from the Conference Hotel

Fujian Tulou - whole day excursion

November 11, Friday

8:00 Start from the Conference Hotel

Gulangyu Island - half day excursion

Abstracts

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Part I

Invited Talks

Expected Residual Minimization for Stochastic Variational Inequalities

Xiaojun Chen

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The stochastic variational inequality (SVI) has been used widely in engineering and economics, as an effective mathematical model for a number of equilibrium problems involving uncertain data. We present an expected residual minimization (ERM) formulation for a class of SVI, including the complementarity problem as a special case. The objective of the ERM-formulation is Lipschitz continuous and semismooth which helps us guarantee the existence of a solution and convergence of approximation methods. Moreover, this minimization problem is convex for linear SVI if the expected matrix is positive semi-definite. We propose a globally convergent (a.s.) smoothing sample average approximation (SSAA) method to minimize the residual function. We show that the ERM problem and its SSAA problems have minimizers in a compact set and any cluster point of minimizers and stationary points of the SSAA problems is a minimizer and a stationary point of the ERM problem (a.s.). We illustrate the ERM and SSAA by examples from traffic equilibrium assignment problems.

Part II

Contributed Talks

Regularized Least squares approximations on the sphere using spherical designs

Congpei An

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We consider polynomial approximation on the unit sphere $\mathbb{S}^2 = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 = 1\}$ by a class of regularized discrete least squares methods, with novel choices for the regularization operator and the point sets of the discretization. We allow different kinds of rotationally invariant regularization operators, including the zero operator (in which case the approximation includes interpolation, quasi-interpolation and hyperinterpolation); powers of the negative Laplace-Beltrami operator (which can be suitable when there are data errors); and regularization operator that yield filtered polynomial approximations. As node sets we use spherical t -designs, which are point sets on the sphere which when used as equal-weight quadrature rules integrate all spherical polynomials up to degree t exactly. More precisely, we use well conditioned spherical t -designs [1] obtained in a previous paper by maximizing the determinants of the Gram matrices subject to the spherical design constraint. For $t \geq 2L$ and an approximating polynomial of degree L it turns out that there is no linear algebra problem to be solved, and the approximation in some cases recovers known polynomial approximation schemes, including interpolation, hyperinterpolation and filtered hyperinterpolation. For $t \in [L, 2L)$ the linear system needs to be solved numerically. Finally, we give numerical examples to illustrate the theoretical results, and show that well chosen regularization operator and well conditioned spherical t -designs can provide good polynomial approximation on the sphere, with or without the presence of data errors.

This is a joint work with Xiaojun Chen, Ian H. Sloan and Robert S. Womersley.

References:

- [1] C. An, X. Chen, I. H. Sloan and R. S. Womersley, *Well conditioned spherical designs for integration and interpolation on the two-sphere*, SIAM J. Numer. Anal., 48 (2010), pp. 2135-2157.
- [2] C. An, X. Chen, I. H. Sloan, and R. S. Womersley, *Regularized spherical least-squares approximations on the sphere using spherical designs*. submitted to SIAM J. Numer. Anal. June 2011.

List of Participants of ICNONLA 2011

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Excursion Information

Fujian Tulou¹

Fujian Tulou (Chinese: 福建土楼; pinyin: Fú Jiàn Tǔ Lóu, literally, “Fujian earthen structures”) is a type of Chinese rural dwellings of the Hakka and others in the mountainous areas in southeastern Fujian, China. They were mostly built between the 12th and the 20th centuries.

A tulou is usually a large, enclosed and fortified earth building, rectangular or circular in configuration, with very thick load-bearing rammed earth walls between three and five storeys high and housing up to 80 families. Smaller interior buildings are often enclosed by these huge peripheral walls which can contain halls, storehouses, wells and living areas, the whole structure resembling a small fortified city.

The fortified outer structures are formed by compacting earth, mixed with stone, bamboo, wood and other readily available materials, to form walls up to 6 feet (1.8 m) thick. Branches, strips of wood and bamboo chips are often laid in the wall as additional reinforcement. The end result is a well-lit, well-ventilated, windproof and earthquake-proof building that is warm in winter and cool in summer. Tulous usually have only one main gate, guarded by 4 - 5-inch-thick (100 - 130 mm) wooden doors reinforced with an outer shell of iron plate. The top level of these earth buildings has gun holes for defensive purposes.

A total of 46 Fujian Tulou sites, including Chuxi tulou cluster, Tianluokeng tulou cluster, Hekeng tulou cluster, Gaobei tulou cluster, Dadi tulou cluster, Hongkeng tulou cluster, Yangxian lou, Huiyuan lou, Zhengfu lou and Hegui lou, have been inscribed in 2008 by UNESCO as World Heritage Site, as “exceptional examples of a building tradition and function exemplifying a particular type of communal living and defensive organization in a harmonious relationship with their environment”.

Gulangyu Island²

¹from Wikipedia: http://en.wikipedia.org/wiki/Fujian_Tulou.

²from Wikipedia: http://en.wikipedia.org/wiki/Gulangyu_Island.

Gulangyu (Chinese: 鼓浪屿; pinyin: Gǔ Làng Yǔ, literally, “Drum Wave Islet”) is a car free island off the coast of Xiamen, Fujian province in southern China, about 2 square kilometres (0.77 sq mi) in area. It is home to about 20,000 people and is a very popular tourist destination. Visitors can reach it by ferry from Xiamen Island in about 5 minutes. Gulangyu Island is renowned for its beaches and winding lanes and its varied architecture. The island is on China’s list of National Scenic Spots and also ranks at the top of the list of the ten most-scenic areas in Fujian Province.

Xiamen (formerly known as Amoy) became a treaty port resulting from China’s loss in the First Opium War and the Treaty of Nanking in 1842, hence the predominantly Victorian-era style architecture throughout Gulangyu Island, where 13 countries including Great Britain, France and Japan established consulates, churches, and hospitals. Gulangyu was officially designated an International Settlement in 1903. Japanese occupation of the island began in 1942, and lasted until the end of World War II. The Amoy dialect of Hokkien is spoken on the island.

As a place of residence for Westerners during Xiamen’s colonial past, Gulangyu is famous for its architecture and for hosting China’s only piano museum, giving it the nickname of “Piano Island” or “The Town of Pianos” or “The Island of Music”. There are over 200 pianos on this island.

The Chinese name also has musical roots, as *gu lang* means drum waves so-called because of the sound generated by the ocean waves hitting the reefs. *Yu* means “islet”.

In addition, there is a museum dedicated to Koxinga, Haidi Shijie Marine World, a subtropical garden containing plants introduced by overseas Chinese, as well as Xiamen Museum, formerly the Eight Diagrams Tower.

There’s also an Organ museum, bird sanctuary, plant nursery, and a tram that takes to the peak. On the west beach of the island you can rent pedal boats and jet skis. There’s a garden of 12 grottos to represent each of the animals on the zodiac. Built into the hillside, its a maze of caves and tunnels to find all twelve (and the exit). There are many boutique hotels to stay in as well.

The island of Gulangyu is a pedestrian only destination, where the only vehicles on the islands are several fire trucks and electric tourist buggies. The narrow streets on the island, together with the architecture of various styles

around the world, give the island a unique appearance.

*The organizing committee wishes
you a pleasant stay in Xiamen!*

