Xidian Sino–Russian Symposium on Probability Theory and Its Applications

西电中-俄概率论及其应用研讨会

Conference Manual

会议手册

School of Mathematics and Statistics

Xidian University, Xi'an, Shaanxi, China

2025.11.14-11.16

● Scientific Committee

Lijun BO (Xidian University)

Congzao DONG (Xidian University)

Zenghu LI (Beijing Normal University)

Vladimir VATUTIN (The Steklov Institute of Mathematics, RAS)

Jimin YE (Xidian University)

● Contact Persons

Congzao DONG E-mail: czdong@xidian.edu.cn

Vladimir VATUTIN E-mail: vatutin@mi-ras.ru

● Conference Affairs

Congzao DONG Tongqing LI Wendi LI Jinpeng LIU Shihua WANG

● Venue and Dates

Accommodation: Ziction Liberal Hotel, Gaoxing Road, Yanta District, Xi'an

Registration: Ziction Liberal Hotel Hall, Dinner at 6:00 pm, November 14th

Talks: Meeting Room 305, Conference Center, North Campus, November 15th-16th

Broadcast online: Tencent Meeting (VooV Meeting) Passcode 949138770

● Sponsors

Division of International Cooperation and Exchanges, Xidian University

School of Mathematics and Statistics, Xidian University

International Joint Research Center for "The Belt and Road" Statistics and Stochastic Theory with Applications, Xi'an International Science and Technology Cooperation Base, Xidian University

The Shaanxi Provincial "Belt and Road" Research in Statistics and Stochastic Theory

Agenda

Xidian Sino–Russian Symposium on Probability Theory and Its Applications				
Nov.15	**Time**	**Speaker**	**Title**	**Chair**
1	8:10-8:30	Opening speech and group photo		
2	8:30-9:10	Makhamat Gafurov	Boundary problems for random walks in the theory of experimental design	Zenghu LI
3	9:15-9:55	Alexey Khartov	On rational-infinitely divisible distributions	
	Tea Break			
4	10:20-11:00	Zenghu Li	Stochastic integral representations for the Lévy forest	Yanxia REN
5	11:05-11:50	Evgeny Prokopenko	Stochastic dynamics near critical points in stochastic gradient descent	
Lunch 12:00-14:00, University East Canteen, 2nd Floor				
6	14:00-14:40	Yanxia Ren	Moments of additive martingales of branching lévy processes and some applications	Kainan XIANG
7	14:45-15:25	Alexander Shklyaev	Limit theorem for Markov linear recurrence sequences in a random environment	
	15:30-15:50	Tea Break		
8	15:50-16:30	Pavel Gumenyuk	Holomorphic dynamics, Loewner theory, and time-inhomogeneous branching processes	Alexey KHARTOV
9	16:35-17:15	Zhongwei Liao	Inferring and forecasting the volatility of cryptocurrency under regime-switching distributed-delay stochastic model	
	18:00	Welcome Banquet, Ziction Liberal Hotel		

Xidian Sino–Russian Symposium on Probability Theory and Its Applications				
Nov.16	**Time**	**Speaker**	**Title**	**Chair**
1	8:30-9:10	Kainan Xiang	The probabilistic approach to the Jacobian conjecture	Alexander SHKLYAEV
2	9:15-9:55	Quan Shi	Stochastic flows and interval-partition Evolutions	
	10:00-10:20	Tea Break		
3	10:20-11:00	Xiaodong Yan	AI for probability：A task-driven limit theory and some statistical application	Quan SHI
4	11:05-11:50	Nikita Gushchin	Building light Schrödinger bridges	
Lunch 12:00-14:00, University East Canteen, 2nd Floor				
	14:30-18:00	Free Discussion Dinner at Ziction Liberal Hotel		

Title and Abstract

Boundary problems for random walks in the theory of experimental design

Makhamat Gafurov

Academy of Labour and Social Relations, Tashkent, Uzbekistan

Abstract

This work is devoted to establishing connections between the distributions of certain functionals induced by the exit of a random walk trajectory beyond a curved boundary and stochastic models for calculating the moments of the number of "necessary" experiments required to achieve a prescribed event.

It is established that, with an appropriate choice of a moving boundary and event, the corresponding mathematical models for the mean value and the number of "necessary" experiments can be expressed in terms of infinite series constructed from large deviation probabilities of the Hoeffding–Robbins–Erdös–Katz type, whose convergence is proved by standard methods.

A more interesting part of the work considers the case when the boundary depends on a small parameter. Exact asymptotic behaviors of the series with respect to this small parameter are obtained. It should be emphasized that, in proving this result, it was necessary to refine known results on the asymptotics of series involving large deviation probabilities. In doing so, the author's own earlier results[1], as well as studies by Chinese colleagues, for example, Y.S. Chow and T.L. Lai[2], Deli Li, Xiangchen Wang, M. Bhaskara[3], Deli Li, Bao-Em Nguyen, and Andrew Rosalsky[4], among others, were employed.

References

[1]M.U. Gafurov, A.D. Slastnikov. Theory of Probability and Its Applications. Vol. 32, No. 3, 1987, pp. 327–348.

[2]Y.S. Chow, T.L. Lai. Transactions of the American Mathematical Society. Vol. 208, 1975, pp. 51–72.

[3]Deli Li, Xiangchen Wang, M. Bhaskara. International Journal of Mathematics and Mathematical Sciences. Vol. 15, No. 3, 1992, pp. 481–498.

[4]Deli Li, Bao-Em Nguyen, Andrew Rosalsky. Journal of Mathematical Analysis and Applications. Vol. 302, 2005, pp. 84–96.

On rational-infinitely divisible distributions

Alexey Khartov

The Kharkevich Institute for Information Transmission Problems, RAS, Moscow

Abstract

In this talk, we present the quasi-stationary distribution for Markov-modulated Markov chains. We focus on two fundamental aspects (existence and uniqueness, convergence) in connection with quasi-stationary distribution. We first provide a sufficient criterion for the existence of the quasi-stationary distribution. An iterative algorithm to compute all quasi-stationary distributions is presented. We then carry out a study on the convergence, from a given initial distribution, to the corresponding quasi-stationary distribution. In addition, we apply the results to M/G/1-type Markov chains, and characterize the asymptotic behavior of the quasi-stationary distribution for this model. Finally, a scalar example is given to illustrate these results.

Stochastic integral representations for the Lévy forest

Zenghu Li

Beijing Normal University

Abstract

A stochastic integral representation is proved for the local time of the height process of a spectrally positive Lévy process stopped at a hitting time. From the representation we derive a strong stochastic equation of the type of Dawson and Li (Ann. Probab., 2012). This leads to a representation of the Ray-Knight theorem of Le Gall and Le Jan (Ann. Probab., 1998) and Duquesne and Le Gall (Astérisque, 2002), which codes the genealogical forest of a continuous-state branching process. The result extends the recent work of Aidékon et al. (Sci. China Math., 2024) for a Brownian motion with a local time drift.

Stochastic dynamics near critical points in stochastic gradient descent

Evgeny Prokopenko

The Sobolev Institute of Mathematics, RAS (Novosibirsk)

Abstract

The talk is devoted to limit theorems for additive stochastic gradient descent (SGD) with a fixed step size that eventually tends to zero. We analyze the local asymptotic behavior of SGD and establish conditions under which the process converges to critical points or remains in their vicinity.

The main object of study is the Markov chain defined by the recurrence:

$$x_{n+1}^{\epsilon} = x_n^{\epsilon} - \epsilon f(x_n^{\epsilon}) + \epsilon \xi_{n+1}$$

where $f: \mathbb{R} \to \mathbb{R}$ is a suitable function; $\{\xi_n\}$ is a sequence of independent and identically distributed (i.i.d.) random variables representing noise; $\epsilon > 0$ is the step size, which tends to zero; $x_0 \in \mathbb{R}$ is the initial point.

The central problems addressed in the talk are: Under what conditions on $f, \{\xi_n\}, n_\epsilon$, and x_0
(i) does $x_{n_\epsilon}^{\epsilon}$ converge to a minimum of f?
(ii) does $x_{n_\epsilon}^{\epsilon}$ remain in a neighbourhood of a stationary point (e.g., a maximum)?
(iii) does $x_{n_\epsilon}^{\epsilon}$ transition to a minimum that is not in the basin of attraction of x_0?
For nontrivial dynamics, we require $n_\epsilon \gg \frac{1}{\epsilon}$, ensuring the process evolves rather than remaining near the initial point with high probability. The condition $\mathbb{E}[\xi_1] = 0$ is essential; otherwise, the process effectively minimizes $f(x) - \mathbb{E}[\xi_1] \cdot x$ rather than $f(x)$.
We consider two cases for the noise distribution: finite variance $\mathrm{Var}(\xi_1) < \infty$ and regularly varying noise with $\alpha \in (1,2)$.
For problems (i) and (ii), the conditions on f are rather general, and the limit theorems include both convergence in probability and almost sure convergence. However, for problem (iii) (transition probabilities between minima), we obtain a complete answer only in the special case of a sharp maximum, specifically when $f(x) = -|x|$.

This is joint work with Dmitry Dudukalov, Artem Logachov, Vladimir Lotov, Timofei Prasolov, and Anton Tarasenko.

Moments of additive martingales of branching Lévy processes and some applications

Yanxia Ren

Peking University

Abstract

Let $W_t(\theta)$ be the Biggins martingale of a supercritical branching Lévy process with non-local branching mechanism, and denote by $W_\infty(\theta)$ its limit. In this talk, we first study properties of $W_\infty(\theta)$. We provide sufficient and necessary conditions for $W_\infty(\theta)$ to have finite p th moment and sufficient conditions for $\mathbb{E}(W_\infty(\theta)^p L(W_\infty(\theta))) < \infty$, where L is slowly varying at infinity. We also study the tail behavior of $W_\infty(\theta)$. We then use our results on $W_\infty(\theta)$ to establish central limit theorems and stable central limit theorems for $W_t(\theta) - W_\infty(\theta)$.

The talk is based on joint work with Renming Song and Rui Zhang.

Limit theorem for Markov linear recurrence sequences in a random environment

Alexander Shklyaev

Lomonosov Moscow State University, Moscow

Abstract

The perpetuity model

$$Y_{n+1} = A_n Y_n + B_n, n \geq 0$$

where (A_n, B_n) are i.i.d. random vectors, is well studied (see, for example, [1]). We can easily represent it in the form

$$Y_{n+1} = \sum_{i=-1}^{n} B_i \mathrm{e}^{S_n - S_i}$$

where $B_{-1} := Y_0$. However, is the assumption that B_n are independent and identically distributed crucial?

While studying the large deviations of branching processes in a random environment (BPRE) in 2018, we found that it's not. A branching process $\{Z_n\}$ in a random environment η can be represented in the form

$$Z_{n+1} = \sum_{i=1}^{Z_n} X_{n+1,i} = Z_n \mathbb{E}_\eta X_{n+1,1} + \sum_{i=1}^{Z_n} (X_{n+1,i} - \mathbb{E}_\eta X_{n+1,i}) =: A_n Z_n + B_n.$$

Here $B_n, n \geq 1$, are dependent and have different distributions. However, by the Zygmund-Marcinkiewicz inequality we know that

$$\mathbb{E}(|B_n|^h Z_{n-1}) \leq C(h) Z_{n-1}^{h*} \mathbb{E}|X_{n-1} - \mathbb{E}X_{n,1}|^h, h \geq 1,$$

where $h^* = \max(1, h/2)$. Using this estimate, we found the exact asymptotic of the large deviation probabilities for BPRE (see [2]).

However, what about other limit theorems for BPRE? Can we prove them for a Markov chain $\{Y_n\}$ in a random environment $\boldsymbol{\eta}$, represented in the form (1), where $\{A_n\}$ is a sequence of i.i.d. $\boldsymbol{\eta}$-measurable random variables, but $\{B_n\}$ is of a general form? We call the sequence $\{Y_n\}$ a Markov Linear Recurrence Sequence in a Random Environment (MLRSRE). We assume the condition

$$\mathbf{E}(|B_n|^h Y_{n-1,} \boldsymbol{\eta}) \leq \kappa_n Y_{n-1},$$

where $\{\kappa_n\}$ is a sequence of i.i.d. $\boldsymbol{\eta}$-measurable random variables, and $h > 1$ is some parameter. This representation holds for BPRE, BPRE with immigration (see [3]), Bisexual BPRE (see [4]), and some particular cases of Maximal Branching Processes and Maximal BPRE. In the report we will discuss limit theorems for MLRSRE. The main results for BPRE - such as normal deviations, non-extinction probabilities in different regimes (critical, subcritical), extinction of a population with a large initial number of particles, upper large deviations, lower large deviations, functional limit theorems - can be proved for MLRSRE under general conditions. Bibliography

[1] Buraczewski D., Damek E., Mikosch T. "Stochastic Models with Power-Law Tails: The Equation X = AX + B". Spinger (2016).

[2] Shklyaev, A. V. "Large deviations of branching process in a random environment." Discrete Mathematics & Applications 31.4 (2021): 281-291.

[3] Shklyaev, A.V. "Large deviations of branching process in a random environment. II." Discrete Mathematics & Applications 31.6 (2021): 431-447.

[4] Shklyaev, A.V. "Large deviations of bisexual branching process in random environment." Discrete Mathematics & Applications 35.3 (2025): 173-186.

Holomorphic dynamics, Loewner theory, and time-inhomogeneous branching processes

Pavel Gumenyuk

Politecnico di Milano, Milan

Abstract

At the beginning of the talk, we present a brief introduction to the iteration theory of holomorphic self-maps of a simply connected domain in the complex plane, both in case of discrete and continuous time. In Probabilities, iteration of holomorphic self-maps is classically known to arise naturally in the study of homogeneous branching processes. The non-autonomous holomorphic dynamical systems, which in the probabilistic context correspond to inhomogeneous branching processes, are studied in the so-called Loewner Theory, originated from an attempt to solve Bieberbach's famous problem in the theory of conformal mappings. Using a general version of Loewner Theory due to F. Bracci, M.D. Contreras, and S. Díaz-Madrigal [J. Reine Angew. Math. (2012)] we study inhomogeneous branching processes with continuous state and time.
New results presented in the talk are obtained in a joint project with T. Hasebe (Hokkaido University, Sapporo, JAPAN) and J.-L. Pérez Garmendia (Centro de Investigación en Matemáticas, Guanajuato, MÉXICO)

Inferring and forecasting the volatility of cryptocurrency under regime-switching distributed-delay stochastic model

Zhongwei Liao

Beijing Normal University at Zhuhai

Abstract

We propose a regime-switching volatility model for cryptocurrency that mathematically couples a classical Ornstein-Uhlenbeck (OU) process with a distributed-delay OU (delay-OU) process. This structure allows volatility to alternate between regimes of fast mean reversion and memory-dependent mean reversion. Methodologically, we extend the Expectation-Maximization (EM) framework to accommodate delayed mean-reverting emissions and design a regime-aware forecasting scheme. This scheme combines regime-conditional predictions with inferred regime state probabilities. Empirically, using daily log-realized variance constructed from high-frequency prices, the model achieves strong in-sample fit and reveals an interpretable latent regime path: a low-volatility, persistent delay-OU regime and a high-volatility OU regime. Transitions between these regimes align with salient macroeconomic and financial events. Out of sample, the regime-switching forecaster consistently outperforms single-regime OU and delay-OU benchmarks. This synthesis of regime heterogeneity and delayed mean reversion improves volatility inference and prediction in cryptocurrency markets and furnishes quantitative diagnostics of macro-financial regime transitions.

The probabilistic approach to the Jacobian conjecture

Kainan Xiang

Xiangtan University

Abstract

In this talk, we will describe and discuss the following probabilistic approach to the Jacobian conjecture, introduced by E. Bisi, P. Dyszewski, N. Gantert, S. G. G. Johnston, J. Prochno and D. Schmid [(2023). Random planar trees and the Jacobian conjecture. arXiv:2301.08221v3 [math.CO], Preprint.]: If there is an integer such that for all natural numbers , there exists a -shuffle Markov chain on large -Catalan trees with the uniform distribution being its stationary distribution, then the Jacobian conjecture is true. And we will also discuss our own related probability questions. The Jacobian conjecture, proposed by Ott-Heinrich Keller in 1939, says that any polynomial mapping on with a nonzero constant Jacobian determinant has an inverse polynomial mapping. As one of the outstanding open problems in all of mathematics (particularly in algebraic geometry), the conjecture was listed as one of 18 mathematical problems for the 21st century by Steve Smale in 1998.

Stochastic flows and interval-partition evolutions

Quan Shi

Academy of Mathematics and Systems Science, CAS

Abstract

The Ray-Knight theorems establish a fundamental connection between Brownian local time and squared Bessel processes. Recently, Aïdékon–Hu–Shi extended this framework to an infinite-dimensional representation via stochastic flows, inheriting the spirit of the works of Bertoin–Le Gall and Dawson–Li. Building on their framework, we study a pair of coupled stochastic squared Bessel flows parametrised by $\delta \in (0,2)$ and construct a partition of the space-time plane $\mathbb{R}_+ \times \mathbb{R}$. We prove that these partitions correspond to squared Bessel excursions with a negative parameter $-\delta$, which are naturally embedded within the jumps of a spectrally positive $(1+\mathrm{delta}/2)$ stable process. This connection further allows us to relate these structures to Björnberg–Curien–Stefánsson's shredded sphere, and to interval-partition evolutions introduced in a series of works by Forman–Pal–Rizzolo–Winkel.
Joint work with Elie Aïdékon (Fudan University) and Chengshi Wang (Fudan University)

AI for probability：A task-driven limit theory and some statistical application

Xiaodong Yan

Xi 'an Jiaotong University

Abstract

The development of AI models can be divided into three stages: traditional statistical learning, machine/deep learning, and today's task-driven large-model era. In each stage, probability-based uncertainty quantification has its own meaning and methodology. Task-driven statistical methods differ fundamentally from traditional data- or model-driven approaches: task-driven AI acts as a task engine, built on information engines formed by data- and model-driven methods. Better information engines support better decisions for specific goals. Yet a complete limit theory for uncertainty quantification in this "task-driven probability" framework is still missing.

This talk builds on multi-armed bandit models. By breaking the classical exchangeability assumption and mapping uncertainty distributions into a strategy space, we study the law of large numbers and central limit theorem in a broader distributional setting, leading to a strategic law of large numbers and a strategic central limit theorem. Probabilistically, this extends nonlinear expectation theory to data-level statistical applications, and reveals several paradoxes such as "independent + independent = dependent," "good + bad = better," and "normal + normal = non-normal," highlighting the limits of traditional data-driven methods for task-driven goals. Statistically, we show how strategic limit theory applies to estimation and hypothesis testing, explain its mathematical logic and advantages, and illustrate the unique strengths of a task-driven statistical mindset through business cases from DiDi and Huawei.

Building light Schrödinger bridges

Nikita Gushchin

Skolkovo Institute of Science and Technology, Moscow

Abstract

The Schrödinger Bridge (SB) problem, originally proposed by Erwin Schrödinger in 1931, seeks the most likely stochastic evolution connecting two probability distributions over time under a reference diffusion process such as Brownian motion. Recently, SBs have attracted growing attention as a promising extension of generative diffusion models, closely related to Entropic Optimal Transport (EOT). Despite notable advances in computational approaches to SBs, most existing solvers remain computationally heavy and require complex optimization of multiple neural networks.

To address this issue, we propose LightSB, a novel lightweight solver for the Schrödinger Bridge problem. LightSB exploits the intrinsic optimal structure of SBs and enables direct minimization of the Kullback–Leibler divergence with respect to the ground-truth solution, using only the start and end marginals.

School of Mathematics and Statistics, XDU
西安电子科技大学数学与统计学院

The school of Mathematics and Statistics of Xidian University was established in July 2013, and it can be traced back to the Basic Courses Teaching Department at the early stage of the university. It has been gradually expanded, going through the Mathematics Teaching and Research Section, Applied Mathematics Department, and Mathematics Department in the School of Sciences.

At present, the school has a doctoral program in Mathematics (first-level discipline), a master's program in Statistics (first-level discipline), a professional master's program in Applied Statistics, a center for post-doctoral studies of mathematics. It has three undergraduate majors, including Mathematics and Applied Mathematics (national first-class undergraduate major construction point, provincial prestigious and characteristic major), Statistics (provincial first-class undergraduate major construction point), and Information and Computing Science (provincial first-class undergraduate major construction point). Based on the Master Students training plan of basic subjects, it offers advanced classes to cultivate top-notch innovative compound talents. Currently the school has 4 departments, 1 research center and 1 research institute. The school has 131 Faculty Members, including 119 full-time teachers, 17 doctoral supervisors, 24 professors and 60 associate professors. The school boasts a competitive faculty team, with 1 national Ten Thousand Talents Program professor, 1 national New Century Million Talents Program professor, 1 national distinguished professor, 1 member of National Advisory Committee under the Ministry of Education, 1 Cross-Century Excellent Talent, 2 New-Century Outstanding Talents, 2 recipients of special allowance of the State Council, 2 professors selected into Shaanxi Provincial Talents Program, 1 Provincial Morality Model Teacher, 1 Provincial Model Teacher of Teaching Master Students, 1 winner of Shaanxi Provincial Outstanding Youth Fund, 2 young outstanding talents of Shaanxi Colleges and Universities, and 4 candidates of Youth Talent Promotion Program of Shaanxi Science and Technology Association.

The school is responsible for the teaching of the university general course of mathematics, mathematical modeling education and competition training. At present, there is 1 national teaching team, 2 provincial teaching teams, 2 national excellent MOOCs and 4 provincial excellent MOOCs. Two national plan textbooks have been published. The school has successively won 3 national teaching achievement awards and more than 10 provincial teaching achievement awards. Guiding Master Students to participate in mathematical modeling competitions, it has gained more than 300 international and national awards, including 3 Outstanding Winners and 1 Finalist in MCM/ICM (Mathematical Contest in Modeling & Interdisciplinary Contest in Modeling), 13 nominations for special prize, 1 MATLAB Innovation Award, 1 national excellent paper and 1 special prize of national postgraduate mathematical modeling competition. The level and number of awards rank top among all the domestic universities.

The school strives for high-quality teaching, first-class discipline construction, cutting-edge scientific research and high-level talents cultivation. It aims to build a well-known and distinctive discipline at home and abroad. The school attaches equal importance to teaching and scientific

research, pays attention to interdisciplinary research, and focuses on strengthening internationalization and informatization. Great progress has been made in every aspect. In the past five years, it has chaired over 170 scientific projects with research funding of over 26 million yuan. Many high-quality papers have been published, including 120 in the CAS Q2 journals or above, 1 ESI hot spot paper, 9 ESI highly cited papers and 1 in the 100 Most Influential Academic Papers in China. The faculty of the school have won numerous awards, including 3 first prizes and 1 second prize of Shaanxi Science & Technology Award, 1 second prize of Xi'an Science & Technology Award, 3 Shaanxi Youth Science & Technology Award, and several awards from provincial and ministerial associations. With more than 200 PhD graduates and 4 provincial excellent doctoral dissertations, the discipline of mathematics in this university has been top 20% in the country for many years, according to China's Best Discipline Ranking. The school has recommended outstanding undergraduate, master and doctoral Master Students to participate in international visiting programs, joint training programs, degree-pursuing programs and other special projects funded by China Scholarship Council.

In the past 5 years, it has chaired 73 research projects supported by China National Natural Science Foundation and published around 400 SCI papers. In addition, many of its research findings have been awarded and published in related top and peer-reviewed journals, including Advances in Mathematics, Transactions of the American Mathematical Society, SIAM Journal on Applied Mathematics, Calculus of Variations and Partial Differential Equations, Journal of Algebra, Journal of Differential Equations, SIAM Journal on Financial Mathematics, IEEE Transactions on Neural Networks, IEEE Transactions on Signal Processing, Inverse Problem and Journal of Optimization Theory and Applications. Thus, the published papers have been important to the university and to the ESI rankings of the university's key disciplines.

Participants

No.	Surname	Given name	Institution
1	**Bo**	Lijun	Xidian University
2	**Chang**	Weiqiang	Xidian University
3	**Chen**	Yuejia	Xidian University
4	**Dong**	Congzao	Xidian University
5	**Duan**	Jiangtao	Xidian University
6	**Gao**	Xueyang	Xidian University
7	**Gao**	Weifeng	Xidian University
8	**Gufurov**	Makhamat	Academy of Labour and Social Relations, Tashkent
9	**Gufurov**	Ilkhomjon	Academy of Labour and Social Relations, Tashkent
10	**Gumenyuk**	Pavel	Politecnico di Milano, Milan
11	**Gushchin**	Nikita	Skolkovo Institute of Science and Technology, Moscow
12	**Khartov**	Alexey	The Kharkevich Institute for Information Transmission Problems, RAS, Moscow
13	**Li**	Benchong	Xidian University
14	**Li**	Jichun	Xidian University
15	**Li**	Tongqing	Xidian University

16	**Li**	Wendi	Xidian University
17	**Li**	Yuhan	Xidian University
18	**Li**	Zenghu	Beijing Normal University
19	**Liang**	Zhan	Xidian University
20	**Liao**	Zhongwei	Beijing Normal University at Zhuhai
21	**Liu**	Jiahua	Xidian University
22	**Liu**	Jinpeng	Xidian University
23	**Liu**	Yuanlin	Xidian University
24	**Liu**	Zhong	Xidian University
25	**Prokopenko**	Evgeny	Sobolev Institute of Mathematics, RAS, Novosibirsk
26	**Ren**	Yanxia	Peking University
27	**Shen**	Yulong	Xidian University
28	**Shi**	Quan	Academy of Mathematics and Systems Science, CAS
29	**Shklyaev**	Alexander	Lomonosov Moscow State University, Moscow
30	**Sun**	Shiyu	Xidian University
31	**Vatutin**	Vladimir	The Steklov Institute of Mathematics, RAS, Moscow
32	**Wang**	Li	Beijing University of Chemical Technology
33	**Wang**	Shihua	Xidian University

34	**Wang**	Xiaohua	Xidian University
35	**Wang**	Yiming	Xidian University
36	**Xiang**	Kainan	Xiangtan University
37	**Yan**	Wenxin	Xidian University
38	**Yan**	Xiaodong	Xi'an Jiaotong University
39	**Yang**	Dongfang	Xidian University
40	**Ye**	Jimin	Xidian University
41	**Zhang**	Chi	Ocean University of China
42	**Zhang**	Chunfang	Xidian University
43	**Zhang**	Jing	Chongqing Technology and Business University
44	**Zhang**	Ruiheng	Xidian University
45	**Zhu**	Jiangle	Xidian University