Workshop on Disturbed Random Processes (IV)

扰动随机过程论坛（IV）

Conference Manual

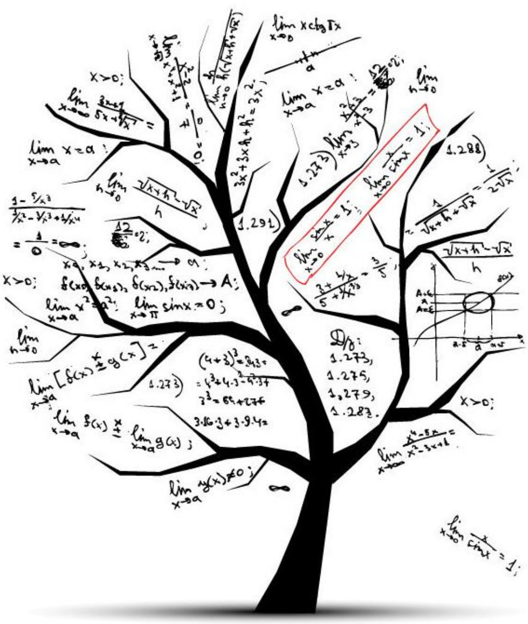
会议手册

School of Mathematics and Statistics

Xidian University, Xi'an, Shaanxi, China

December 17, 2025

Contents 目录



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● Meeting Form, Venue and Date 会议形式地点和时间

Form 形式：Online Only 线上

Online Platform 会议平台： Voov Meeting+Zoom Meeting

✿ **Voov ID** 腾讯会议 ID**: 198-376-405** Free access 无密码

Website Access 会议网络入口：https://meeting.tencent.com/dm/ilCQY5BEdo1m

♥ **Zoom ID** Zoom 会议 ID**: 872 3609 2675 Passcode: 758724**

Website Access 会议网络入口:

https://knu-ua.zoom.us/j/87236092675?pwd=N2iCzYg9HXqEb6wP3IHRbvUlUX2fCi.1

Date 会议日期：Wednesday，December 17 十二月十七日周三

● Sponsors 主办单位和赞助

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人社部国家外国专家项目（H 类 H20240850）

Agenda 会议日程

Workshop on Disturbed Random Processes (IV)					
No.	**Beijing Time**	**Kyiv Time**	**Speaker**	**Title**	**Chair**
1	15:50-16:00	09:50-10:00	Opening speech by the Vice Dean, Professor Shiliang Wu		
2	16:00-16:30	10:00-10:30	Tusheng Zhang	Stochastic reaction diffusion equations with superlinear coefficients	Oleksandr Iksanov
3	16:35-17:05	10:35-11:05	Valeriya Kotelnikova	A law of the iterated logarithm for sums of independent indicators, with application to Karlin's occupancy scheme	
4	17:10-17:40	11:10-11:40	Deng Zhang	Recent progress on stochastic Navier-Stokes equations	Shen Peng
5	17:45-18:15	11:45-12:15	Konrad Kolesko	Explosions in branching processes	
Break (25 minutes)					
6	18:40-19:10	12:40-13:10	Jing Zhang	Strong Feller property and ergodicity of gneralized Ornstein-Uhlenbeck processes	Oleksandr Marynych
7	19:15-19:45	13:15-13:45	Ilya Molchanov	Strong limit theorems for depth trimmed regions	
8	19:50-20:20	13:50-14:20	Vitali Wachtel	Berry-Esseen inequality for random walks conditioned to stay positive	Congzao Dong
9	20:25-20:55	14:25-14:55	Alexander Marynych	Zeros of polynomials: limiting distribution, exponential profiles, and free probability	

Titles and Abstracts 题目与摘要

Stochastic reaction diffusion equations with superlinear coefficients

Tusheng Zhang

University of Science and Technology of China, Hefei, China

Abstract

In this talk, I will report the progress on the global well-posedness of stochastic reaction diffusion equations with superlinear coefficients in the cases of bounded domain, the whole line and the L^2 setting.

A law of the iterated logarithm for sums of independent indicators, with application to Karlin's occupancy scheme

Valeriya Kotelnikova

Taras Shevchenko National University of Kyiv, Ukraine

Abstract

I will discuss a law of the iterated logarithm (LIL) for an infinite sum of independent indicators parameterized by t and monotone in t. If the expectation b and the variance a of the sum are comparable, then the normalization in the LIL includes the iterated logarithm of a. If the expectation grows faster than the variance,while the ratio log b/log a remains bounded, then the normalization in the LIL includes the single logarithm of a (so that the LIL becomes a law of the single logarithm). Finally, I will present an application of the LIL to the number of occupied boxes and related quantities in Karlin's occupancy scheme. The talk is based on a joint paper with Dariusz Buraczewski (Wroclaw) and Oleksandr Iksanov (Kyiv).

Recent progress on stochastic Navier-Stokes equations

Deng Zhang

Shanghai Jiaotong University, Shanghai, China

Abstract

In this talk I will review some recent results on stochastic Navier-Stokes equations (NSE). We first consider the 3D stochastic NSE with additive Gaussian noise and show that, for arbitrarily prescribed finite energy initial data, there exist infinitely many global-in-time weak solutions with continuous energy profiles. Further result on energy dissipative solutions will be derived as well, which is related to the weak-strong uniqueness principle due to Lions. Moreover, we consider the 2D stochastic vorticity NSE where the random force is non-Gaussian and is highly degenerate, acting only a few Fourier modes. We show that the corresponding Lagrangian flow exhibits the chaotic behavior characterized by the strict positivity of the top Lyapunov exponent.

Explosions in branching processes

Konrad Kolesko

Technical University of Wroclaw, Poland

Abstract

We consider generalized branching processes. In these models, an explosion refers to the event in which infinitely many particles appear within a finite time.In this talk, I will present necessary and sufficient conditions for an explosion to occur with positive probability.

The presentation is based on joint work with Gerold Alsmeyer, Matthias Meiners, and Jakob Stonner.

Strong Feller property and ergodicity of gneralized Ornstein-Uhlenbeck processes

Jing Zhang

Chongqing Technology and Business University, Chongqing, China

Abstract

By a coupling method, we prove some upper bound estimates for the variations of the transition probabilities of a generalized Ornstein-Uhlenbeck process driven by bivariate Lèvy process. From those results, we derive the strong Feller property and the exponential ergodicity of the process in Wasserstein distances under conditions given directly by the characteristic triplets of the driving noises.

Strong limit theorems for depth trimmed regions

Ilya Molchanov

University of Bern, Switzerland

Abstract

We study empirical variants of the halfspace (Tukey) depth of a probability measure μ, which are obtained by replacing μ with the corresponding weighted empirical measure. We prove analogues of the Marcinkiewicz--Zygmund strong law of large numbers and of the law of the iterated logarithm in terms of set inclusions and for the Hausdorff distance between the theoretical and empirical variants of depth trimmed regions. In the special case of μ being the uniform distribution on a convex body K, the depth trimmed regions are convex floating bodies of K, and we obtain strong limit theorems for their empirical estimators.

Joint work with A. Ilienko and R. Turin.

Berry-Esseen inequality for random walks conditioned to stay positive

Vitali Wachtel

Bielefeld University, Germany

Abstract

We consider random walks conditioned to stay positive. If the mean of increments is zero and variance is finite, then the properly scaled random walk converges to the Rayleigh distribution. In the present talk we discuss a Berry-Esseen type estimates for conditioned walks and show that the rate of convergence is of order $n^{-1/2}$ provided that the third absolute moment is finite. Moreover, we describe the dependence of the constant in the Berry-Esseen estimate on the distribution of increments.

This talk is based on a joint work with Denis Denisov and Aleksandr Tarasov.

Zeros of polynomials: limiting distribution, exponential profiles, and free probability

Alexander Marynych

Taras Shevchenko National University of Kyiv, Ukraine

Abstract

In this talk we study polynomials with real nonnegative zeros as their degrees tend to infinity. A well-known result of Harper shows that under very mild assumptions the coefficients of such polynomials satisfy a central limit theorem. Drawing on this result and using tools from large deviations theory we show that the convergence of the empirical distributions of zeros is equivalent to the existence of a so-called exponential profile of the polynomials. This finding has several important consequences for (finite) free probability. For example it provides a simple proof that finite free convolutions converge to free convolutions even for distributions that are not compactly supported. In addition the method enables the analysis of the dynamics of zeros under repeated differentiation or under the action of the heat-flow operator. The talk is based on joint work with J. Jalowy and Z. Kabluchko.

Introduction to School of Mathematics and Statistics, XDU

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.

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