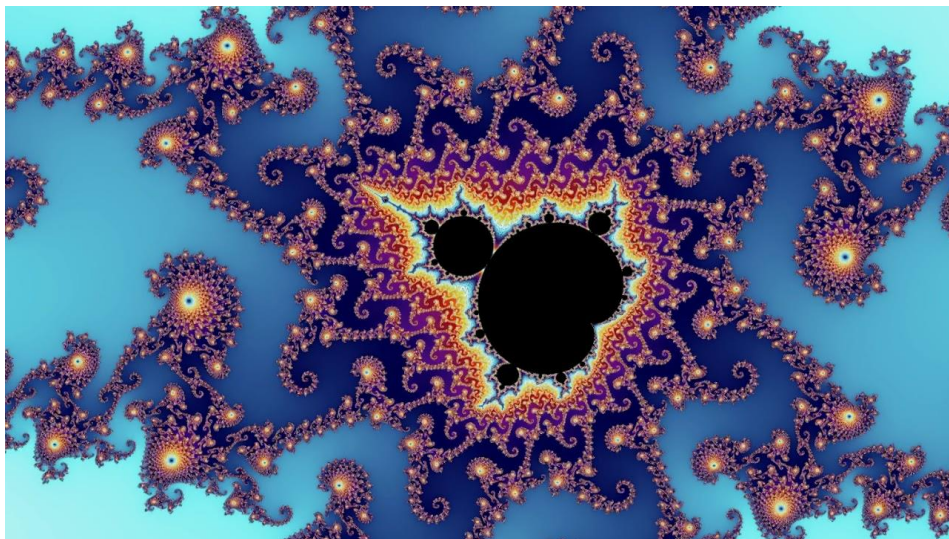




2023 International Conference on Dynamical systems and related topics



July 5—8, 2023

**School of Mathematics and statistics, Fujian Normal University,
Fuzhou, China**

Conference Host:

**School of Mathematics and Statistics,
Fujian Normal University**

Conference Venue:

**Meiyuan Hotel,
350 Guobin Avenue, Shangjie Town, Fuzhou, China**

International Academic Committee

Vladmir Anashin, Moscow State University, Russian

Yongluo Cao, Soochow University, China

Guizhen Cui, Shenzhen University, China

Dejun Feng, The Chinese University of Hong Kong, China

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Online Presentation Platform and Hall

The online presentation platform is the Zoom. To join in the online conference, either click the Zoom link

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or enter the Zoom ID: 917 1798 1299 (password: 202307) .

The conference Hall is the Multi-Function Hall Floor F in Meiyuan Hotel.

Kind notice: The time shown in the following program is in Beijing time(GMT+8). Please pay attention to the time difference with your local area.

Conference Program

July 5 Registration: Time: 8:00-24:00 Meiyuan Hotel, Minhou, Fuzhou			
July 6			
Time	Speaker	Chairman	Title
7:00-8:00	Breakfast		
8:30		Jian Wang	Opening Ceremony
8:50	Take Photo		
9:00	Yuefei Wang	Aihua Fan	On Periodic Points and Normality of Holomorphic Functions
9:55	Weixiao Shen		Ergodic Optimization for expanding maps on the unit circle
10:40	Break		
11:00	Hexi Ye	Yueping Jiang	Intersection Theory in Dynamical Systems
11:40	Meng Wu		A Marstrand type projection theorem for regular fractal measures, and applications
12:10	Launch		
14:30	Martine Queffelec (online)	Lingmin Liao	Dynamics of the Furstenberg set
15:25	Herve Queffelec (online)		Littlewood's subordination principle for weighted Hardy spaces
16:10	Break		
16:30	Vladimir Anashin (online)	Yuefei Wang	Quantum systems : a p-adic view
17:20	Yujun Zhu		Rotation and entropy for torus maps

18:05	Supper
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July 7			
Time	Speaker	Chairman	Title
7:00-8:00	Breakfast		
9:00	Xinggong He	Yujun Zhu	Uniqueness set of trigonometric series, Moran set and spectral measure theory
9:55	Ronggang Shi		Random walks on homogeneous spaces
10:25	Break		
10:45	Guohua Zhang	Bing Li	Measures with maximal entropy for Bowen and packing topological entropies of subsets
11:20	Yanqi Qiu (online)		Self-absorption property for Hankel systems
11:50	Launch		
14:30-17:50	Free talk		
17:50	Supper		

July 8			
Time	Speaker	Chairman	Title
7:00-8:00	Breakfast		
9:00	Quansheng Liu	Qirong Deng	Large deviations and Gaussian approximation for products of random matrices
9:55	Jihua Ma		Level sets of multiple ergodic averages
10:40	Break		
11:00	Baowei Wang	Shilei Fan	Metric theories of limsup sets defined by rectangles

11:40	Ruxi Shi		Application of waist inequality to entropy and mean dimension
12:10	Launch		
14:30	Jiayan Yao	Hexi Ye	Profinite groups, rigidity, and finite automata
15:25	Jorg Schmeling (online)		Thermodynamics of potentials with log-singularity
16:10	Break		
16:30	Jie Wu (online)	Quansheng Liu	Riemann hypothesis and random multiplicative functions
17:20	Aihua Fan		A question from analyse and ergodic theory with comments on the author of the question
18:05	Supper		
July 9 Departure			

Titles and Abstracts

Quantum systems : a p -adic view

Vladimir Anashin

1. Faculty of Computational Mathematics and Cybernetics, Lomonosov Moscow State University. 2. Federal Research Center 'Information and Control' , Russian Academy of Sciences

ABSTRACT : In the talk, it will be argued that basic notions of quantum theory (wave function, observable, pure state, mixed state, etc.) can naturally be expressed in terms of functions whose domain and range are p -adic integers and which satisfy the p -adic Lipschitz condition with a constant 1 (briefly, the p -adic 1-Lipschitz maps). The latter maps constitute the class of all causal functions; the functions describe evolution of quantum systems in theories with a minimum scale lengths. In these terms it is possible to reveal how randomness emerges in quantum systems, how wave function collapses, etc. The approach is motivated by the ideas of I.V.Volovich and G.'t Hooft and can be judged as a contribution to the p -adic mathematical physics initiated by V.S.Vladimirov in 1988. The talk is mostly based on the papers

1. Anashin, V. Free Choice in Quantum Theory : A p -adic View. Entropy 2023, 25, 830. <https://doi.org/10.3390/e25050830>
2. Vladimir Anashin. Toward the (non-cellular) automata interpretation of quantum mechanics : Volovich postulates as a roadmap. International Journal of Modern Physics A, Vol. 37, No. 20–21, 2243003 (2022). <https://doi.org/10.1142/S0217751X22430035>

A question from analyse and ergodic theory with comments on the author of the question.

Aihua Fan

Central China Normal University, Université de Picardie Jules Verne

ABSTRACT : TBA

Uniqueness set of trigonometric series, Moran set and spectral measure theory

Xinggong He

Central China Normal University

ABSTRACT : In this talk, we will first introduce the simple history on the study of uniqueness set problem of trigonometric series, then give several relationships between Moran set theory and spectral measure theory. Some open problems will be given in the talk.

Large deviations and Gaussian approximation for products of random matrices

Quansheng Liu

Université de Bretagne-Sud

ABSTRACT : Some recent progress on limit theorems for products of independent and identically distributed random matrices will be presented. We focus on precise large deviations and convergence rates in the Gaussian approximation. Applications to branching processes and branching random walks will also be presented. (Mainly based on a joint work with Hui Xiao and Ion Grama, J. Eur. Math. Soc. 2022)

Level sets of multiple ergodic averages

Jihua Ma

Wuhan University

ABSTRACT : Using the Riesz products, we study a class of special multiple ergodic averages. This is an early joint work with Aihua Fan and Lingmin Liao.

Self-absorption property for Hankel systems

Yanqi Qiu

Wuhan University

ABSTRACT : We introduce the notion of self-absorption property (SAP) for families in C^* -algebras and talk about our result that any Hankel system associated with a cancellative monoid has SAP provided that it satisfies the so-called lunar condition (which holds true for all cancellative Abelian monoids).

Many natural open problems will be discussed. The talk is based on an ongoing joint work with Yong HAN and Zipeng WANG.

Littlewood's subordination principle for weighted Hardy spaces

Hervé Queffélec

Université de Lille Nord de France

ABSTRACT : Given a sequence $\beta = (\beta_n)_{n \geq 0}$ of positive numbers, the associated weighted Hardy space $H^2(\beta)$ is the Hilbert space of analytic functions $f(z) = \sum_{n=0}^{\infty} a_n z^n$ on the unit disk \mathbb{D} such that

$$\|f\|_{\beta}^2 = \sum_{n=0}^{\infty} |a_n|^2 \beta_n < \infty.$$

Classical examples are the Hardy space ($\beta_n = 1$), the Bergman space ($\beta_n = 1/(n+1)$), the Dirichlet space ($\beta_n = n+1$). Given an analytic self-map (a symbol) of \mathbb{D} , the associated composition operator with symbol φ is defined by

$$C_{\varphi}(f) = f \circ \varphi.$$

When $\beta_n \equiv 1$, the C_{φ} are all bounded on H^2 (Littlewood's subordination principle). The purpose of this talk is three-fold :

1. Give a full characterization of those weights β for which all C_{φ} are bounded on $H^2(\beta)$ when φ is an automorphism of \mathbb{D} : β is slowly oscillating.
2. Give a full characterization of those weights β for which all C_{φ} are bounded on $H^2(\beta)$ when φ is an arbitrary symbol : β is slowly oscillating **and** essentially decreasing.
3. Give a counterexample showing that a separate characterization of those weights β for which all C_{φ} are bounded whenever $\varphi(0) = 0$, if it exists, will not be simple.

This is recent joint work with P. Lefèvre, D. Li and L. Rodríguez-Piazza.

Dynamics of the Furstenberg set

Martine Queffélec

Université de Lille Nord de France

ABSTRACT : The set $S = \{2^j 3^k, j, k \geq 0\}$ i.e. the multiplicative semi-group generated by 2 and 3, has been studied for a long time, and in its first letter to Hardy (1913), Ramanujan claimed that

$$|S_N| := |S \cap [1, \dots, N]| \sim \frac{\log 2N \times \log 3N}{2 \log 2 \log 3}. \quad (1)$$

Several years later, Hardy obtained an estimate of the error term, then generalized by Marstrand (among others) to multiplicative semi-groups. If we denote by the same S the sequence $1 = s_1 < s_2 < \dots < s_n < \dots$ of its elements, (1) implies that $s_n \approx e^{b\sqrt{n}}$ with $b = \sqrt{2 \log 2 \log 3}$. In particular, S exhibits an intermediate growth, between the exponential and the polynomial ones. And this behavior makes this set very interesting from the harmonic analysis point of view, where many questions are still open.

A second motivation for studying this set arises from its link with the famous (still open) metric conjecture of Furstenberg; for that reason, we called S the *Furstenberg set*. This time, the distribution of the sequence has to be explored in depth and the arithmetic comes into play.

In this talk, we sketch the state of art (results and open questions) in those two approaches, with emphasize on the dynamics.

(Based on a joint work with Fan Ai Hua and Hervé Queffélec.)

Thermodynamics of potentials with log-singularity

Jörg Schmeling

Lund University, Centre for Mathematical Sciences

ABSTRACT : Thermodynamic formalism entered different fields of mathematics. In particular some questions in number theory, combinatorics, harmonic analysis or mathematical physics can be studied by means of methods developed by thermodynamic formalism. However in some interesting cases the potential function has logarithmic singularities that are not covered by the standard methods. I will talk about some recent developments initiated by Aihua Fan and joint with W. Shen, Ph. Gohlke and G. Lamprinakis.

Ergodic Optimization for expanding maps on the unit circle

Weixiao Shen

Shanghai Center for Mathematical Sciences, Fudan University

ABSTRACT : TBA

Random walks on homogeneous spaces

Ronggang Shi

Shanghai Center for Mathematical Sciences, Fudan University

ABSTRACT : We introduce the notion of expanding measures on a real linear group. It is a probability measure which expands all the nonzero vectors in any finite dimensional representation without nonzero fixed vectors. We show that random walks on homogeneous spaces with respect to the action of an expanding measure have rigidity properties. More precisely, the ergodic stationary measures are always supported on an orbit of a closed subgroup and invariant with respect to the translation of this group.

Application of waist inequality to entropy and mean dimension

Ruxi Shi

Université de Sorbonne

ABSTRACT : Waist inequality is a fundamental inequality in geometry and topology, which was introduced by Gromov. This inequality and its variants have applications in several areas, for example convex geometry and combinatorics. In this talk, I will present its application to the study of entropy and mean dimension of dynamical systems. I will also discuss the result to the theory of topological conditional entropy and dynamical embedding problems. This is based on a joint work with Masaki Tsukamoto.

Metric theories of limsup sets defined by rectangles

Baowei Wang

Huazhong University of Sciences and Technology

ABSTRACT : Dirichlet theorem and Minkowski theorem are two fundamental theories about the distribution of real numbers/vectors, which induce respectively the study of the metric theory of limsup sets defined by balls and by rectangles. In this talk, we will discuss the metric theory of limsup sets defined by rectangles, including the measure theory and Hausdorff theory.

On Periodic Points and Normality of Holomorphic Functions

Yuefei Wang

Shenzhen University

ABSTRACT : We will talk about our recent results on the lower bounds for the numbers of periodic points of polynomials and rational functions, and their applications to establishing new normality criteria of families of meromorphic functions. This is joint work with Bingmao Deng and Mingliang Fang.

Riemann hypothesis and random multiplicative functions

Jie Wu

CNRS, UPEC, France

ABSTRACT : Let $\mu(n)$ be the Möbius function. Then it is well known that the Riemann hypothesis is equivalent to

$$\sum_{n \leq x} \mu(n) \ll_{\varepsilon} x^{1/2+\varepsilon} \quad (x \geq 1)$$

for any $\varepsilon > 0$. Let $\{f(p)\}_{p \text{ primes}}$ be a sequence of independent Bernoulli random variables taking values ± 1 with probability $1/2$. Extending f by multiplicativity to a random multiplicative function f supported on the squarefree integers, we could consider $f(n)$ as probabilistic model of $\mu(n)$. In this talk, we prove that, for any $\varepsilon > 0$, the estimate

$$\sum_{n \leq x} f(n) \ll_{\varepsilon} \sqrt{x} (\log \log x)^{2+\varepsilon}$$

holds almost surely. This inequality improves significantly corresponding result of Wintner, Erdős and Halász; and provides heuristic support to the Riemann hypothesis. We also present some new progress in this direction.

This is a joint work with Y.-K. Lau & G. Tenenbaum.

A Marstrand type projection theorem for regular fractal measures, and applications

Meng Wu

University of Oulu, Finland

ABSTRACT : I will present a Marstrand type projection theorem for fractal measures with certain regular structures. If time permits, I will also present several applications of this projection result in the domain of fractal geometry.

Profinite groups, rigidity, and finite automata

Jiayan Yao

Tsinghua University

ABSTRACT : In this talk, we shall study compatible dynamical systems over profinite groups, and show that such dynamical systems have very strong rigidity. Then we give two applications for finite automata.

动力系统中的相交理论

Hexi Ye

Zhejiang University

ABSTRACT : 在这个报告中, 我们将简要介绍一下动力系统中的一些相交理论, 以及现有的一些结果。

Measures with maximal entropy for Bowen and packing topological entropies of subsets

Guohua Zhang

Fudan University

ABSTRACT : Given any topological dynamical system, in 2012 Feng and Huang introduced the measure-theoretical lower and upper entropies for arbitrary Borel probability measure, and proved the variational principle concerning Bowen topological entropy (packing topological entropy, respectively) and the measure-theoretical lower entropy (upper entropy, respectively). In this talk, we will discuss the existence of measures with maximal entropy for Bowen and packing topological entropies of subsets. This is a work in progress, joint with Xulei Wang.

Rotation and entropy for torus maps

Yujun Zhu

Xiamen University

ABSTRACT : In this talk, we consider the rotation and entropy for the torus maps. The notion of rotational entropy is introduced and it is shown that the rotational entropy is a homotopy invariant. For the random torus maps, we show that the rotation set is a random compact and connected set. We also show that the rotational entropy is stable under (random) small perturbation.

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Useful Information

Program: The Provisional Schedule is subject to further possible change. Please consult the notice board for confirmation, especially if you chair a session or give a talk. Please contact organizers if you have any questions.

Multi-Media Facilities: We will provide multi-media facilities for the presentation of your talk. To avoid possible incompatibility of your file with our facilities, we would be grateful if you would provide us your files in PDF format.

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