《中国科学：数学》分析分编委会暨分析及几何研讨会

会议日程

主办方：《中国科学：数学》杂志社

承办方：哈尔滨工业大学数学研究院

2020.01.11—01.14

《中国科学：数学》分析分编委会暨分析及几何研讨会

报到: 2020 年 1 月 11 日

会议日期: 2020 年 1 月 12 日-14 日

组委会:

- 洪家兴 (复旦大学)
- 葛力明 (中国科学院数学与系统科学研究院)
- 许全华 (哈尔滨工业大学)

承办委员会：

- 许全华 (哈尔滨工业大学)
- 张 超 (哈尔滨工业大学)
- 方 健 (哈尔滨工业大学)
- 尹 智（哈尔滨工业大学）
- 吴劲松（哈尔滨工业大学）

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参会人员名单：

- 步尚全（清华大学）
- 陈　化（武汉大学）
- 程崇庆（南京大学）
- Xuan Thinh Duong (Macquarie University, Australia)
- 葛力明 (中国科学院数学与系统科学研究院)
- 关　波（The Ohio State University, USA）
- 洪家兴（复旦大学）
- 黄飞敏（中国科学院数学与系统科学研究院）
- 黄　文（中国科学技术大学）
- 蒋春澜（河北师范大学）
- 李嘉禹（中国科学技术大学）
- 李　勇（吉林大学）
- 林华新（University of Oregon, USA/华东师范大学）
- 刘建亚（山东大学）
- 王跃飞（中国科学院数学与系统科学研究院）
- 吴　杰（Universite Paris-Est Creteil）
- 辛周平（香港中文大学）
- 徐　佩（Northwestern University）
- 颜立新（中山大学）
- 叶向东（中国科学技术大学）
- 张　然（吉林大学）
- 张伟年（四川大学）
- 张　旭（四川大学）
- 张志涛（中国科学院数学与系统科学研究院）
- 朱小华（北京大学）
- 许全华（哈尔滨工业大学）
- 薛小平（哈尔滨工业大学）
- 吴勃英（哈尔滨工业大学）
- 张　超（哈尔滨工业大学）
- 尹　智（哈尔滨工业大学）
- 方　健（哈尔滨工业大学）
- 吴劲松（哈尔滨工业大学）
- 熊　枭（哈尔滨工业大学）

日程安排

1 月 12 日

08.45 - 09.00 报到/开幕

09.00 - 11.00 编委会议

11.00 - 11.15 **合影/茶歇**

11.15 - 12.00 叶向东

12.15 - 14.00 **午餐**

14.00 - 14.45 辛周平

14.45 - 15.15 **茶歇**

15.15 - 16.00 陈化

16.15 - 17.00 Xuan Thinh Duong

17.30 - 19.00 **晚餐**

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1 月 13 日

08.45 - 09.30 王跃飞

09.35 - 10.20 程崇庆

10.20 - 10.35 **茶歇**

10.35 - 11.20 张旭

11.25 - 12.05 朱小华

12.15 - 14.00 **午餐**

下午：自由讨论

17.30 - 19.00 **晚餐**

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1 月 14 日

08.45 - 09.30 李嘉禹

09.35 - 10.20 黄文

10.20 - 10.35 **茶歇**

10.35 - 11.20 吴杰

12.00 - 14.00 **午餐**

Gevrey smoothing effect for the spatially inhomogeneous Boltzmann equations without cut-off

陈化（武汉大学）

Abstract： In this article we study the Gevrey regularization effect for the spatially inhomogeneous Boltzmann equation without angular cut-off. This equation is partially elliptic in the velocity direction and degenerates in the spatial variable. We consider the nonlinear Cauchy problem for the fluctuation around the Maxwellian distribution and prove that any solution with mild regularity will become smooth in Gevrey class at positive time, with Gevrey index depending on the angular singularity. Our proof relies on the symbolic calculus for the collision operator and the global sub-elliptic estimate for the Cauchy problem of linearized Boltzmann operator.

Three ways to cross double resonance

程崇庆（南京大学）

Abstract: As it was for seen by Arnold, it is the final step towards the resolution of the problem of Arnold diffusion to examine the transition from single to double resonance. In this talk, threes ways to cross double resonance will be demonstrated. In particular, we are surprised to find a new way so that the problem of double resonance is solved in a very simple way.”

Some recent progress on boundedness of singular integrals with non-smooth kernels and function spaces associated to operators

Xuan Thinh Duong (Macquarie University, Australia)

Abstract: We give a survey concerning some recent progress on the study of singular integrals with rough kernels (so that these operators do not belong to the standard class of Calderon-Zygmund operators) and various classes of function spaces associated to operators in different settings.

Compactness and singularity related to harmonic maps

李嘉禹（中国科学技术大学）

Abstract: In the talk we will review compactness results and regularity theorems related to harmonic maps. We first talk about maps from Riemann surfaces with tension filed bounded in a local Hardy space, then talk about stationary harmonic maps from higher dimensional manifolds, finally talk about heat flow of harmonic maps.

Ergodic optimization theory for a class of typical maps

黄文（中国科学技术大学）

Abstract: In this talk, we introduce some progress in ergodic optimization theory for Yuan and Hunt's conjecture. This is a joint work with Prof. Zeng Lian, Xiao Ma, Leiye Xu and Yiwei Zhang.

Towards presenting primes by polynomials

吴杰 (CNRS, Universite Paris-Est Creteil)

Abstract: It is a fundamental and challenging problem to determine in general whether a given irreducible polynomial in $\mathbb{Z}[X]$ can capture infinitely many prime values. This is known in the linear case in view of Dirichlet's theorem on primes in arithmetic progressions, but no answer is valid for any non-linear cases. A much more ambitious conjecture asserts that the above infinitude also holds if one is restricted to prime variables and there are no fixed prime factors; however, even the linear case seems beyond the current approach as predicted by the twin prime conjecture. Nevertheless, we are nowadays much heartened since $p+h$ can present infinitely many primes for certain h with $1<|h|\leq 7\times 10^7$, thanks to Zhang's breakthrough on prime gaps. In this talk, we are interested in the case of quadratic polynomials at prime arguments. It is of course beyond the current approach to prove the infinitude of primes captured by such polynomial, and alternatively, we consider the greatest prime factors and almost prime values as two approximations. This is a joint work with Ping Xi.

Periodic points and normality concerning multiplicity

王跃飞（中国科学院数学与系统科学研究院）

Abstract: We will talk our recent results on the exact lower bound for the numbers of periodic points of rational maps with multiple fixed points and poles, and as a main application, a new criterion of normal family of holomorphic maps with multiple fixed points and poles. The precise calculations of periodic points of rational maps are extremely complicated. The main ingredients and the most interesting part in our proof is to combine conformal conjugations with calculations by making use of Maple. This is a joint work with Bingmao Deng and Mingliang Fang.

Degenerate potential equation and subsonic-sonic flows

辛周平（香港中文大学）

Abstract: Steady compressible irrotational subsonic-sonic flows in general finite two dimensional nozzles are governed by the potential flow equation which is degenerate at sonic points. The wellposedness of regular solutions is a long standing open problem with only partial results are available in the literature. In this talk I will present a rather complete theory of the wellposedness of Lipchitz continuous solutions for such a problem for general smooth nozzles. More importantly, the location of the sonic points is completely characterized by the geometry of the nozzle. This is a joint work with Chunpeng Wang.

On the recent progress related to sequence entropy

叶向东（中国科学技术大学）

Abstract: We will present some recent progress related to sequence entropy and will state several open questions. The talk is based on two recent results joint work with Snoha-Zhang and Huang-Lian-Shao respectively.

Exact controllability of a refined stochastic wave equation

张旭（四川大学）

Abstract: A widely used stochastic wave equation is the classic wave equation perturbed by a term of Itô's integral. We show that this equation is not exactly controllable even if the controls are effective everywhere in both the drift and the diffusion terms. In some sense it means that some key feature is ignored in this model. Then, based on a stochastic version of Newton's law, we propose a refined stochastic wave equation. By means of a new global Carleman estimate, we establish the exact controllability of our stochastic wave equation with three controls. Moreover, we give a result about the lack of exact controllability, which shows that the action of three controls is necessary. Our analysis indicates that, at least from the view point of control theory, the new stochastic wave equation introduced in this work is more reasonable than the one in the existing literature. This is a joint work with Qi Lü.

Variation, polytopes and KE metrics on Q-Fano varieties

朱小华（北京大学）

Abstract: In this talk, we introduce a variation method to study the Kaehler-Einstein metrics (possibly singular) on Q-Fano compatifications of reductive Lie groups. On such Q-Fano varieties, we can reduce the Euler-Langrange functional of KE equation to a reduced Ding-functional with a weighted Monge-Ampere measure for convex functions on the moment polytope. Then we will derive a similar criterion for the existence of KE metrics on the smooth compatifications proved by Delcroix and Li-Zhou-Zhu.