2021 年动力系统与非线性分析研讨会

--纪念陈省身先生诞辰 110 周年

程序册

2021 年 5 月 21-23 日
南开大学，天津

组委会：龙以明 刘春根 胡锡俊 张端智 段华贵

联系人：张端智（13820167238） 段华贵（13752615639）

李红琴（13820626278）

报告安排：

	5 月 21 日	5 月 22 日	5 月 23 日
主持人	龙以明	尤建功	胡锡俊
8:50-9:00	开幕式		
9:00 – 9:35	章梅荣	叶向东（线上）	尤建功
9:35 – 10:10	袁小平	李　勇	彭双阶
10:10--10:30	茶歇	（5 月 22 日茶歇期间合影）	
主持人	刘春根	王志强	张端智
10:30 – 11:05	曹道民	邹文明	刘兆理
11:05 – 11:40	张志涛	严　军	王　嵬
12:00 – 13:00	午餐	午餐	午餐
主持人	章梅荣	邹文明	离会
14:30 – 15:05	张伟年	王志强	
15:05 – 15:40	王友德	曹永罗	
15:40 – 16:00	茶歇		
主持人	朱朝锋	段华贵	
16:00– 16:35	薛金鑫	孙善忠	
16:35 – 17:10	连　增（线上）	刘　会	
17:30 – 18:30	晚餐	晚餐	

报告地点：　省身楼一楼多功能厅

5 月 20 日， 星期四

10:00-20:00 陈省身数学研究所**嘉园报到**

5 月 21 日， 星期五

（省身楼一楼多功能厅）

主持人：龙以明 （南开大学)

8:50-9:00 开幕式

9:00-9:35 章梅荣（清华大学）

On the Structure of Periodic Eigenvalues of the Rotating p-Laplacian

9:35-10:10 袁小平 (复旦大学)

亚纯函数的 Cartan 估计及其应用

10:10-10:30 **茶歇**

主持人：刘春根 （广州大学)

10:30-11:05 曹道民（中国科学院数学与系统科学研究院，广州大学）

二维不可压缩欧拉方程及相关问题的一些结果

11:05-11:40 张志涛 (江苏大学，中国科学院数学与系统科学研究院)

Normalized solutions to the Chern-Simons-Schrodinger system and fractional Schrodinger equations

12:00-13:00 **午餐**

主持人: 章梅荣（清华大学）

14:30-15:05 张伟年 (四川大学)

Invariant manifolds with/without hyperbolicity

15:05-15:40 王友德（广州大学，中国科学院数学与系统科学研究院）

Global weak solutions to Landau-Lifshtiz systems with spin-polarized transport

15:40-16:00 茶歇

主持人: 朱朝锋　(南开大学)

16:00-16:35 薛金鑫（清华大学）

Initial Perturbation of Mean Curvature Flow

16:35-17:10 连增（四川大学）线上

Mane-Conze-Guivarc'h Lemma for random Anosov systems

5 月 22 日，星期六
（省身楼一楼多功能厅）

主持人: 尤建功 （南开大学)

9:00-9:35 叶向东（中国科学技术大学）线上

动力系统中的幂零结构

9:35-10:10 李 勇 (吉林大学)

TBA

10:10-10:30 茶歇 （省身楼前合影）

主持人: 王志强 （犹他州立大学)

10:30-11:05 邹文明 (清华大学)

On Sirakov's open problem and related topics

11:05-11:40 严军 (复旦大学)

Hamilton—Jacobi 方程解的长期行为

12:00-13:00 **午餐**

主持人: 邹文明 (清华大学)

14:30-15:05 王志强 (犹他州立大学)

Multiple nodal solutions having shared component-wise nodal numbers for coupled elliptic systems

15:05-15:40 曹永罗 （苏州大学）

SRB measures for a class of partially hyperbolic attractors

15:40-16:00 **茶歇**

主持人: 段华贵　(南开大学)

16:00-16:35 孙善忠 (首都师范大学)

Analytic Continuation of the Hadamard product

16:35-17:10 刘会（武汉大学）

Contact three-manifolds with exactly two simple Reeb orbits

5 月 23 日， 星期日

（省身楼一楼多功能厅）

主持人: 胡锡俊 （山东大学)

9:00-9:35 尤建功（南开大学）

Transition space for the continuity of the Lyapunov exponent of quasiperiodic Schr\"odinger cocycles

9:35-10:10 彭双阶（华中师范大学）

On the scalar curvature problem with very degenerate prescribed functions

10:10-10:30 **茶歇**

主持人: 张端智 (南开大学)

10:30-11:05 刘兆理 (首都师范大学)

Structure of solution set of elliptic equations and systems via invariant set of flow

11:05-11:40 王嵬 (北京大学)

Irrationally elliptic closed characteristics on compact convex hypersurfaces in R^{2n}

12:00-13:00 **午餐**

Titles and Abstracts

曹道民　(中国科学院数学与系统科学研究院, 广州大学)
  二维不可压缩欧拉方程及相关问题的一些结果

报告人将报告新近对二维不可压欧拉方程所得到的一些研究结果，特别地要介绍在涡对行波解（travelling vortex pairs）、 旋转对称解的存在性和及推广的面拟地转方程（surface quasi-geostrophic equation）的旋转对称解和行波解的存在性。报告人介绍的结果主要来源于和赖善发、詹伟城及和秦国林、詹伟城、邹昌君合作的论文。

曹永罗　(苏州大学)

SRB measures for a class of partially hyperbolic attractors

In this talk，we consider the existence of SRB measure for partially hyperbolic attractors. If the systems's central direction can be decomposed into one dimension sub-bundles which are dominated splitting, then there exists a SRB measure.

李勇　(吉林大学)
   TBA

连增　(四川大学)

Mane-Conze-Guivarc'h Lemma for random Anosov systems

In this talk, I will report some recent development of Mane-Conze-Guivarc'h Lemma for random Anosov systems, which builds the connection between extreme points of observables and optimal invariant measures. For random systems, random periodic orbits build the fundation of the Mane-Conze-Guivarc'h Lemma. This is the work joint with Huang Wen and Lu Kening.

刘会 （武汉大学）

Contact three-manifolds with exactly two simple Reeb orbits

It is known that every contact form on a closed three-manifold has at least two simple Reeb orbits, and a generic contact form has infinitely many. We show that if there are exactly two simple Reeb orbits, then the contact form is nondegenerate.Combined with a previous result, this implies that the three-manifold is diffeomorphic to the three-sphere or a lens space. We also obtain further information about the Reeb dynamics and the contact structure. Joint work with Dan Cristofaro-Gardiner, Umberto Hryniewicz, and Michael Hutchings.

刘兆理　**(首都师范大学)**

Structure of solution set of elliptic equations and systems via

invariant set of flow

In this talk, I shall talk about existence, multiplicity and sign properties of solutions to nonlinear elliptic equations and systems which can be investigated via invariant sets of descending flow incorporated into variational methods.

彭双阶 **(华中师范大学)**

On the scalar curvature problem with very degenerate

prescribed functions

We talk about a scalar curvature problem. It is known that there are a number of results related to the existence of solutions concentrating at the isolated critical points of the scalar curvature $K(x)$. However, if $K(x)$ has non-isolated critical points with different degenerate rate along different directions, whether there exist solutions concentrating at these points is still an open problem. We give a certain positive answer to this problem via applying a blow-up argument based on local Pohozaev identities and modified finite dimensional reduction method when the dimension of critical point set of $K(x)$ ranges from 1 to N-1.

孙善忠 **(首都师范大学)**

Analytic Continuation of the Hadamard product

We revisit the analytic continuation to branches other than the principal one of the Hadamard product, thus generalize the classical Hadamard theorem from the perspective of Ecalle's resurgence theory. The talk is based on the joint work with Y. LI and D. SAUZIN.

薛金鑫　**(清华大学)**

Initial Perturbation of Mean Curvature Flow

We show that after a perturbation on the initial data of mean curvature flow, the perturbed flow can avoid certain non-generic singularities. This contributes to the program of dynamical approach to mean curvature flow initiated by Colding and Minicozzi. The key is to prove that a positive perturbation on initial data would drift to the first eigenfunction direction after long time. This result can be viewed as a global unstable manifold theorem in the most unstable direction for a nonlinear heat equation.

王嵬 (北京大学)

Irrationally elliptic closed characteristics on compact convex hypersurfaces in R^{2n}

There is a long standing conjecture in Hamiltonian analysis which claims that there exist at least n geometrically distinct closed characteristics on every compact convex hypersurface in $\R^{2n}$ with $n\ge 2$. In 2002, Y. Long and C. Zhu proved there exist at least $\varrho_n(\Sg)$ geometrically distinct closed characteristics on every compact convex hypersurface $\Sg$ in $\R^{2n}$. Recently, we proved that if a compact convex hypersurface $\Sg$ in $\R^{2n}$ satisfies $\varrho_n(\Sg)=n$ and carries exactly n geometrically distinct closed characteristics, then there are at least two irrationally elliptic closed characteristics on $\Sg$. In particular, if a compact convex hypersurface $\Sg$ in $\R^{2n}$ all of whose prime closed characteristics are non-degenerate carries exactly n geometrically distinct closed characteristics, then there are at least two irrationally elliptic closed characteristics on $\Sg$.

王友德 （广州大学，中国科学院数学与系统科学研究院)

Global weak solutions to Landau-Lifshtiz systems with spin-polarized transport

In this talk, we consider the Landau-Lifshitz-Gilbert systems with spin-polarized transport from a bounded domain in R^3 into S^2 and show the existence of global weak solutions to the Cauchy problems of such Landau-Lifshtiz systems. In particular, we show that the Cauchy problem to Landau-Lifshitz equation without damping but with diffusion process of the spin accumulation admits a global weak solution. The Landau-Lifshtiz system with spin-polarized transport into a compact Lie algebra is also discussed and some similar results are proved. The key ingredients of this article consist of the choices of test functions and approximate equations.

王志强 (犹他州立大学)

Multiple nodal solutions having shared component-wise nodal numbers for coupled elliptic systems

We present recent work for constructing multiple nodal solutions having componentwisely-shared nodal numbers of coupled elliptic systems. This is done by further developing critical point theory with built-in flow invariance which has been a useful tool to give locations of critical points by minimum methods.

严军 **(复旦大学)**

Hamilton—Jacobi 方程解的长期行为

从动力系统的观点看 Hamilton-Jacobi 方程解的长期行为。讨论周期解，异宿解的存在性。

叶向东 **(中国科学技术大学)**

动力系统中的幂零结构

在报告中我们将解释动力系统方法可以应用到数论研究中的原因；介绍幂零系统在相关研究中所起到的作用；最后陈述一些新的研究成果.

尤建功 **(南开大学)**

Transition space for the continuity of the Lyapunov exponent of quasiperiodic Schr\"odinger cocycles

We prove the continuity of the Lyapunov exponent of quasiperiodic Shr\"odinger cocycles in Gevrey space G^{s} with $s<2$ and discontinuity in G^{s} with $s>2$. The first part was done by Cheng-Ge-You-Zhou and the second part by Ge-Wang-You-Zhao。

袁小平 **（复旦大学）**

亚纯函数的 Cartan 估计及其应用

我们给出全纯函数的 Cartan 估计在亚纯函数的一个简单的推广，并给出其分别在算子谱理论和 KAM 理论中的应用。

章梅荣 **（清华大学）**

On the Structure of Periodic Eigenvalues of the Rotating p-Laplacian

The periodic eigenvalue problem is resulted from the variational treatment to the critical points of the p-th kinetic energy under the constant constraint to p-th potential energy of periodic motions in the Euclidean spaces $\R^d$. This is an Euler-Lagrangian equation on $\R^d$. In dimension $d=2$, it has been known that the problem admits two different sequences of eigenvalues. A problem proposed by Man\'asevich and Mawhin 20 years ago is that if these are all periodic eigenvalues.

In this talk, I will show that for any exponent $p\ne 2$, the p-Laplacian on the plane

will actually admit {\ys infinitely many different sequences} of periodic eigenvalues. Some numerical simulations to the new sequences of eigenvalues and eigenfunctions will be given. Several further problems towards to the panorama of the spectral set will be imposed.

张伟年 (四川大学)

Invariant manifolds with/without hyperbolicity

In this talk some advances on invariant manifolds are introduced under assumptions of hyperbolicity, nonuniform hyperbolicity, pseudo-hyperbolicity, or no hyperbolicity. In order to describe hyperbolicity, related problems on roughness and admissibility for exponential dichotomies are discussed.

张志涛 （江苏大学，中国科学院数学与系统科学研究院）

Normalized solutions to the Chern-Simons-Schrodinger system and fractional Schrodinger equations

We introduce normalized solutions to the Chern-Simons-Schrodinger system, which is a gauge-covariant nonlinear Schrodinger system with a long-range electromagnetic field, arising in nonrelativistic quantum mechanics theory. The solutions correspond to critical points of the underlying energy functional subject to the L^2-norm constraint. We also study the normalized solutions of the fractional nonlinear Schrodinger equations with combined nonlinearities, and get the existence and stability of standing waves for the fractional nonlinear Schrodinger equation.

邹文明 （清华大学）

On Sirakov's open problem and related topics

In the present paper, we make some progress on the Sirakov's open problem (Comm. Math. Phys., 2007) about the existence of nontrivial nonnegative solution to the coupled nonlinear system

$$\begin{cases} -\Delta u + \lambda u = \mu_1 u3 + \beta u v^2 & \text{in } R^N, \\ -\Delta v + v = \mu_2 v^3 + \beta u^2 v & \text{in } R^N, \\ u, v > 0 & \text{in } R^N, N \leq 3. \end{cases}$$

We also study some other properties for related questions, such as the uniqueness of the ground state solution, the asymptotic behavior of the least energy solution, nonexistence of the positive solution and the multiplicity of positive solutions, etc.