



中国科学技术大学
University of Science and Technology of China

椭圆与抛物方程会议手册

2025.12.19-2025.12.22





会议信息

一、会议时间

2025年12月19日，会议报到。

2025年12月20日至12月21日，会议学术报告。

2025年12月22日，离会。

二、会议地点

中国科学技术大学第五教学楼 5204 教室

三、特邀报告人

曹道民	中国科学院数学与系统科学研究院	方健	哈尔滨工业大学
郭改慧	江南大学	黄侠	华东师范大学
赖柏顺	湖南师范大学	李从明	上海交通大学
李玉祥	东南大学	林支桂	扬州大学
刘祖汉	扬州大学	彭锐	浙江师范大学
盛伟杰	哈尔滨工业大学	苏一鸣	杭州师范大学
孙宁奎	山东师范大学	陶有山	上海交通大学
王明新	山西大学	吴雅萍	首都师范大学
夏健康	西北工业大学	向长林	三峡大学
向昭银	电子科技大学	周茂林	南开大学

四、组织委员会

陈世炳

李俊钢

麻希南

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五、会务秘书

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会议日程安排

12月19日(周五) 入住酒店			
12月20日(周六)		地点: 五教 5204 教室	
时间	报告人	报告题目	主持人
08:35-08:40	开幕式		麻希南
08:40-09:10	李从明	Some recent work on qualitative analysis of nonlocal PDEs	
09:15-09:45	吴雅萍	The stability of traveling waves for some Keller-Segel chemotactic models	
09:45-10:15	休息及合影		
10:15-10:45	王明新	The life span of solution of a semilinear parabolic equation on locally finite graphs	钮维生
10:50-11:20	向昭银	Global solvability to a 2D Keller-Segel(-Navier-Stokes) system with density-suppressed motility	
11:25-11:55	方 健	Some delay-induced nonlocal problems	
12:00-13:30	午餐地点: 专家楼二楼自助餐厅		
14:00-14:30	刘祖汉	Singular analysis for a fractional MEMS type problem	陈世炳
14:35-15:05	苏一鸣	Multi-solitons to mass-supercritical stochastic nonlinear Schrödinger equations	
15:10-15:40	盛伟杰	Propagation phenomena in reaction-diffusion systems	
15:40-16:10	休息		
16:10-16:40	陶有山	Suppressing blow-up by local anisotropy of signal production in the Keller-Segel system	殷浩
16:45-17:15	郭改慧	Qualitative analysis and pattern formation for vegetation models	
17:20-17:50	赖柏顺	Quantitative regularity for the Navier-Stokes equations and its application	
18:00-19:30	晚餐地点: 专家楼二楼自助餐厅		

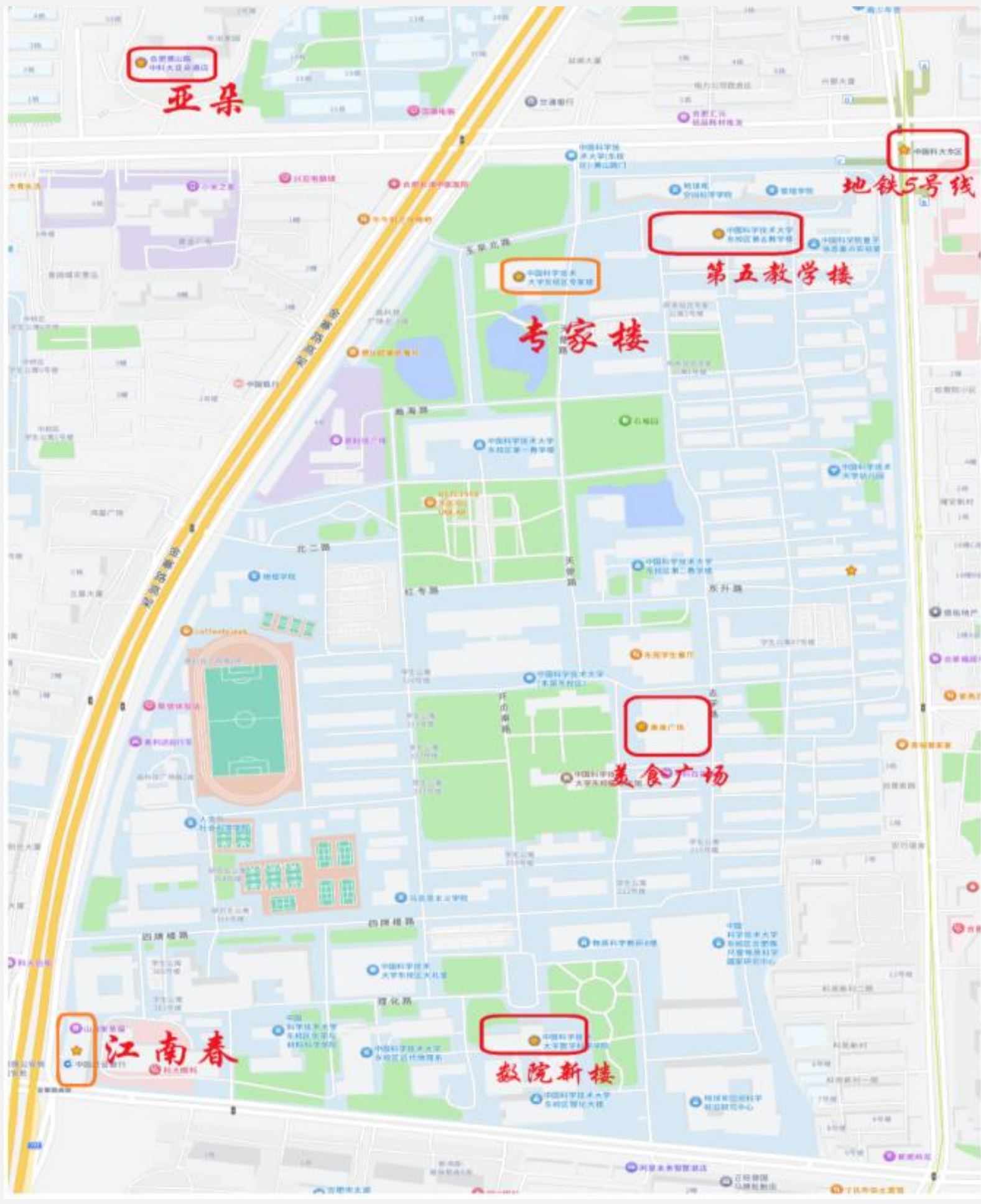


会议日程安排

12月21日(周日)		地点: 五教 5204 教室	
时间	报告人	报告题目	主持人
08:40-09:10	曹道民	Some results on the steady solution for the incompressible Euler equation	梁兴
09:15-09:45	彭锐	Principal eigenvalue problems with Danckwerts boundary conditions	
09:45-10:15	休息		
10:15-10:45	向长林	Regularity theory of fractional harmonic mappings	侍述军
10:50-11:20	夏健康	Non-radial positive solutions for nonlinear Schrödinger systems with mixed couplings	
11:25-11:55	周茂林	Blow-up Profiles and Types of Keller-Segel Model	
12:00-13:30	午餐地点: 专家楼二楼自助餐厅		
14:00-14:30	黄侠	On Sharp Heisenberg Uncertainty Principle and the stability	罗肖
14:35-15:05	孙宁奎	Asymptotic behavior of solutions to a free boundary model with seasonal succession	
15:10-15:40	休息		
15:40-16:10	林支桂	移动区域上的扩散模型及其风险刻画	李俊钢
16:10-16:40	李玉祥	Boundedness in a two-dimensional doubly degenerate nutrient taxis system	
17:30-19:00	晚餐地点: 专家楼二楼自助餐厅		
12月22日(周一) 离会			



校园地图





报告信息

题目: Some recent work on qualitative analysis of nonlocal PDEs

报告人: 李从明, 上海交通大学

时间: 12月20日, 08:40-09:10

摘要: We present some recent work on the analysis of nonlocal problems, focusing on maximum principles, Liouville-type theorems, and the classification of solutions. Related results on a priori estimates and regularity are also discussed. Key topics include Hardy–Littlewood– Sobolev-type systems, curvature-driven geometric equations, and incompressible fluid equations.

题目: The stability of traveling waves for some Keller-Segel chemotactic models

报告人: 吴雅萍, 首都师范大学

时间: 12月20日, 09:15-09:45

摘要: In this talk I shall talk about our recent work on the stability of traveling waves for several types of Keller-Segel chemotactic models with zero chemical random diffusion. By applying detailed spectral analysis and energy estimates, as well as Evan's function method and numerical simulation, we obtain the spectral stability/instability or asymptotic stability of the traveling waves in some exponentially weighted spaces. The talk is based on joint work with Shaoqi Liang, Jingyu Li and Zhian Wang.



报告信息

题目: The life span of solution of a semilinear parabolic equation on locally finite graphs

报告人: 王明新, 山西大学

时间: 12月20日, 10:15-10:45

摘要: Let $G=(V,E)$ be a locally finite connected graph. We develop the first eigenvalue method on G introduced in 1963 by Kaplan on Euclidean space, the discrete Phragmen-Lindelof principle of parabolic equations and upper and lower solutions method on G . Using these methods, we establish the estimates and asymptotic behaviour of the life span of solutions to a semilinear heat equation with initial data $\lambda\psi(x)$ for different scales of λ on G under some different conditions. Our results are different from the continuous case, which is related to the structure of the graph G .

题目: Global solvability to a 2D Keller-Segel(-Navier-Stokes) system with density-suppressed motility

报告人: 向昭银, 电子科技大学

时间: 12月20日, 10:50-11:20

摘要: In this talk, we investigate the global existence and uniform boundedness of classical solutions to a two-dimensional Keller-Segel(-Navier-Stokes) system with signal-dependent motility. The system is subject to a combination of boundary conditions: no-flux for the cell density, inhomogeneous Dirichlet for the chemical signal, (and no-slip for the fluid velocity,) along with suitable initial data.



报告信息

题目: Some delay-induced nonlocal problems

报告人: 方健, 哈尔滨工业大学

时间: 12月20日, 11:25-11:55

摘要: In this talk, I will first recall some classical nonlocal population models induced by time delay, and then I will present a few new models by considering joint effects of time delay and other related factors.

题目: Singular analysis for a fractional MEMS type problem

报告人: 刘祖汉 扬州大学

时间: 12月20日, 14:00-14:30

摘要: We consider the following semilinear elliptic equation involving the fractional Laplacian $(-\Delta)^s u = -u^{-p}$ in B_1 , where $p > 1$, $s \in (0, 1)$, $(-\Delta)^s$ is the s -Laplacian and $B_1 = B_1(0)$ is the unit ball in \mathbb{R}^N . We first establish an optimal Hölder regularity estimate for solutions by using blow-up analysis and Liouville-type theorems. Subsequently, we give a convergence result for sequences of solutions with uniform Hölder continuity. These results are also used to show that the Hausdorff dimension of the rupture set $\{u = 0\}$ satisfies:

$$\dim_{\mathcal{H}}\{u = 0\} \leq N - 2 \quad \text{if} \quad \frac{p+1}{2p} < s < 1;$$

$$\dim_{\mathcal{H}}\{u = 0\} \leq N - 1 \quad \text{if} \quad 0 < s \leq \frac{p+1}{2p}.$$

In particular, the latter one is a new phenomenon arising from the fractional Laplacian.



报告信息

题目: Multi-solitons to mass-supercritical stochastic nonlinear Schrödinger equations

报告人: 苏一鸣, 杭州师范大学

时间: 12月20日, 14:35-15:05

摘要: We consider the stochastic nonlinear Schrödinger equation driven by linear multiplicative noise in the mass-supercritical case. Given arbitrary K solitary waves with distinct speeds, we construct stochastic multi-solitons pathwisely in the sense of controlled rough path. We derive the quantitative decay rates dictated by the noise for the unstable directions, as well as the modulation parameters and remainder in the geometrical decomposition. They are important to close the key bootstrap estimates and to implement topological arguments to control the unstable directions. As a result, the temporal convergence rate of stochastic multi-solitons, which can be of either exponential or polynomial type, is related closely to the spatial decay rate of the noise and reflects the noise impact on soliton dynamics.



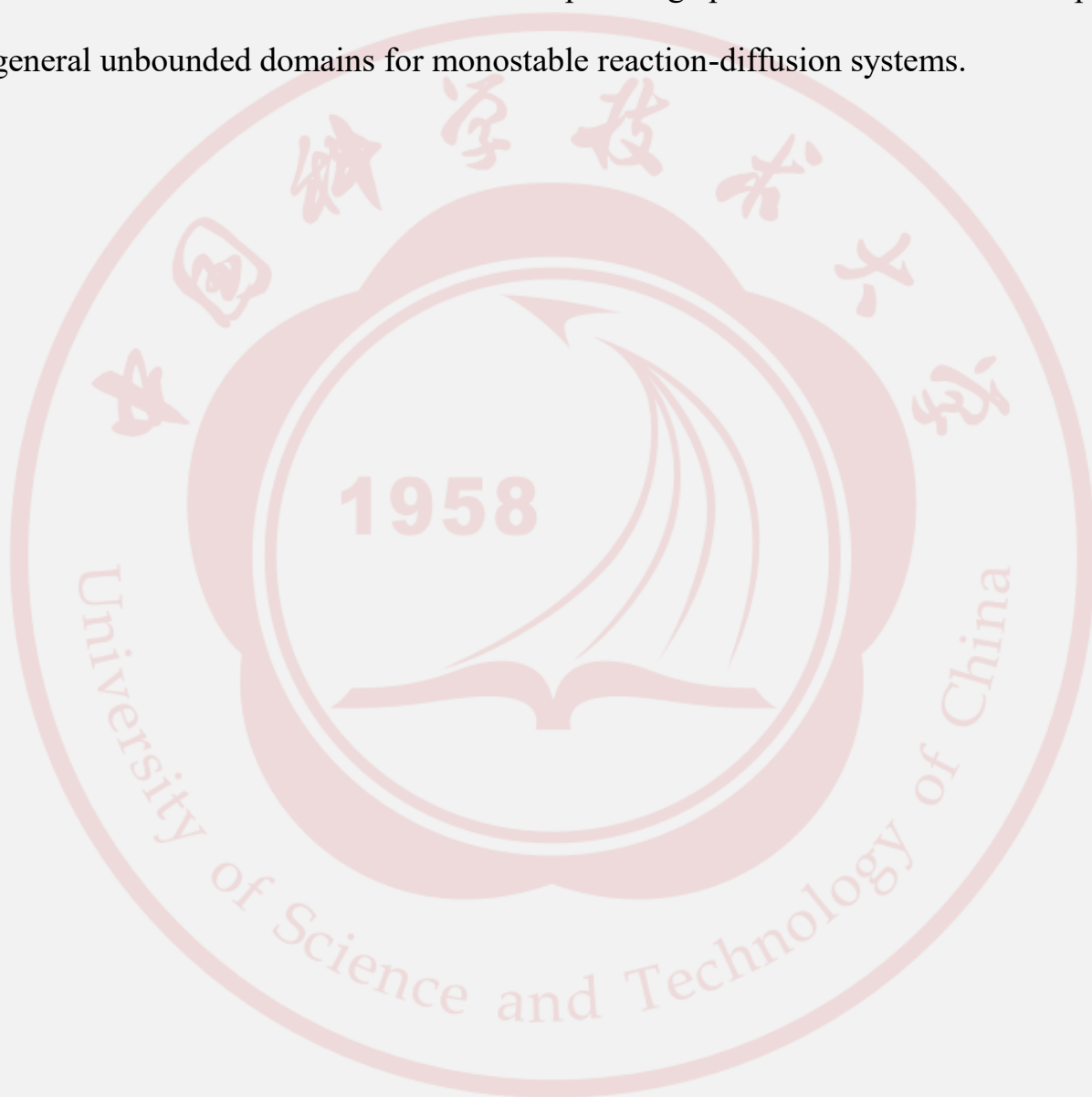
报告信息

题目: Propagation phenomena in reaction-diffusion systems

报告人: 盛伟杰, 哈尔滨工业大学

时间: 12月20日, 15:10-15:40

摘要: Travelling fronts and spreading speeds are known to be two important tools in characterizing propagation phenomena of reaction-diffusion equations. In this talk, we demonstrate that there is a shape-changing entire solution in \mathbb{R}^N , and it is also stable. Then we review some results on spreading speeds and their relationship in general unbounded domains for monostable reaction-diffusion systems.





报告信息

题目: Suppressing blow-up by local anisotropy of signal production in the Keller-Segel system

报告人: 陶有山, 上海交通大学

时间: 12月20日, 16:10-16:40

摘要: In a smoothly bounded domain $\Omega \subset \mathbb{R}^n$, $n \leq 5$, we consider the Neumann initial-boundary problem for the Keller-Segel type system

$$\begin{cases} u_t = D\Delta u - \nabla \cdot (u\nabla v), \\ v_t = d\Delta v + \nabla \cdot (u\nabla v) - v + u, \end{cases} \quad (*)$$

which arises in the modeling for chemotactic movement in the presence of certain anisotropic signal production mechanisms.

Markedly distinguishing (*) from classical Keller-Segel systems for which some solutions are known to blow up in finite time when $n \geq 2$, this problem is shown to admit a unique global bounded classical solution whenever the difference $|D-d|$ is appropriately small. This is a recent joint work with Prof. Michael Winkler (Paderborn).



报告信息

题目: Qualitative analysis and pattern formation for vegetation models

报告人: 郭改慧, 江南大学

时间: 12月20日, 16:45-17:15

摘要: This talk deals with the research progress of vegetation models. The dynamical behavior and coexistence of these models are characterized by using linear and nonlinear analysis methods, which can not only reveal the internal mechanism of vegetation pattern formation, but also provide some control strategies on vegetation pattern evolution.

题目: Quantitative regularity for the Navier-Stokes equations and its application

报告人: 赖柏顺, 湖南师范大学

时间: 12月20日, 17:20-17:50

摘要: In this talk, I will introduce the Quantitative regularity for the Navier-Stokes equations developed by Terence Tao. As an application, we will extend Tao's work to MHD system.



报告信息

题目: Some results on the steady solution for the incompressible Euler equation

报告人: 曹道民, 中国科学院数学与系统科学研究院

时间: 12月21日, 08:40-09:10

摘要: For the 2D incompressible Euler equation, there is a lot of results on the existence of vortex solutions, such as solutions with vorticity compactly supported or vorticity concentrated in several small sets. For the 3D case, the situation is much more difficult. A well-known solution is the vortex ring with small cross-section, traveling with a constant speed along its symmetric-axis, which was observed by Helmholtz in 1858. To get existence of solutions, people usually consider axi-symmetric case and a lot of axi-symmetric solutions have been established by different methods. But very little is known about the uniqueness. The stability of such vortex ring with small cross-section is a long-time open problem. In this talk the speaker will first talk about the uniqueness of such vortex ring. Then the speaker will introduce results on the nonlinear stability of such vortex ring. Lastly the speaker will talk about solutions with helical symmetry. The results presented in this talk are from joint papers with Guolin Qin, Weilin Yu, Weicheng Zhan and Changjun Zou.



报告信息

题目: Principal eigenvalue problems with Danckwerts boundary conditions

报告人: 彭锐, 浙江师范大学

时间: 12月21日, 09:15-09:45

摘要: In this talk, I will report our recent work on principal eigenvalue problems with Danckwerts boundary conditions. We focus on two key scenarios: a finite branch and a finite river network. Our main objective is to investigate the asymptotic behaviors of the principal eigenvalue when the diffusion rate is small or large or the advection rate is large.

题目: Regularity theory of fractional harmonic mappings

报告人: 向长林, 三峡大学

时间: 12月21日, 10:15-10:45

摘要: Fractional harmonic mappings are extensively studied in recent years, due to their close relationship to fractional Ginzburg-Landau equations, Harmonic mappings with free boundary value, nonlocal minimal surfaces and so on. This talk is devoted to regularity theory of fractional harmonic mappings, which plays a very fundamental role in application and is also very important for further study such as the energy identity problem.



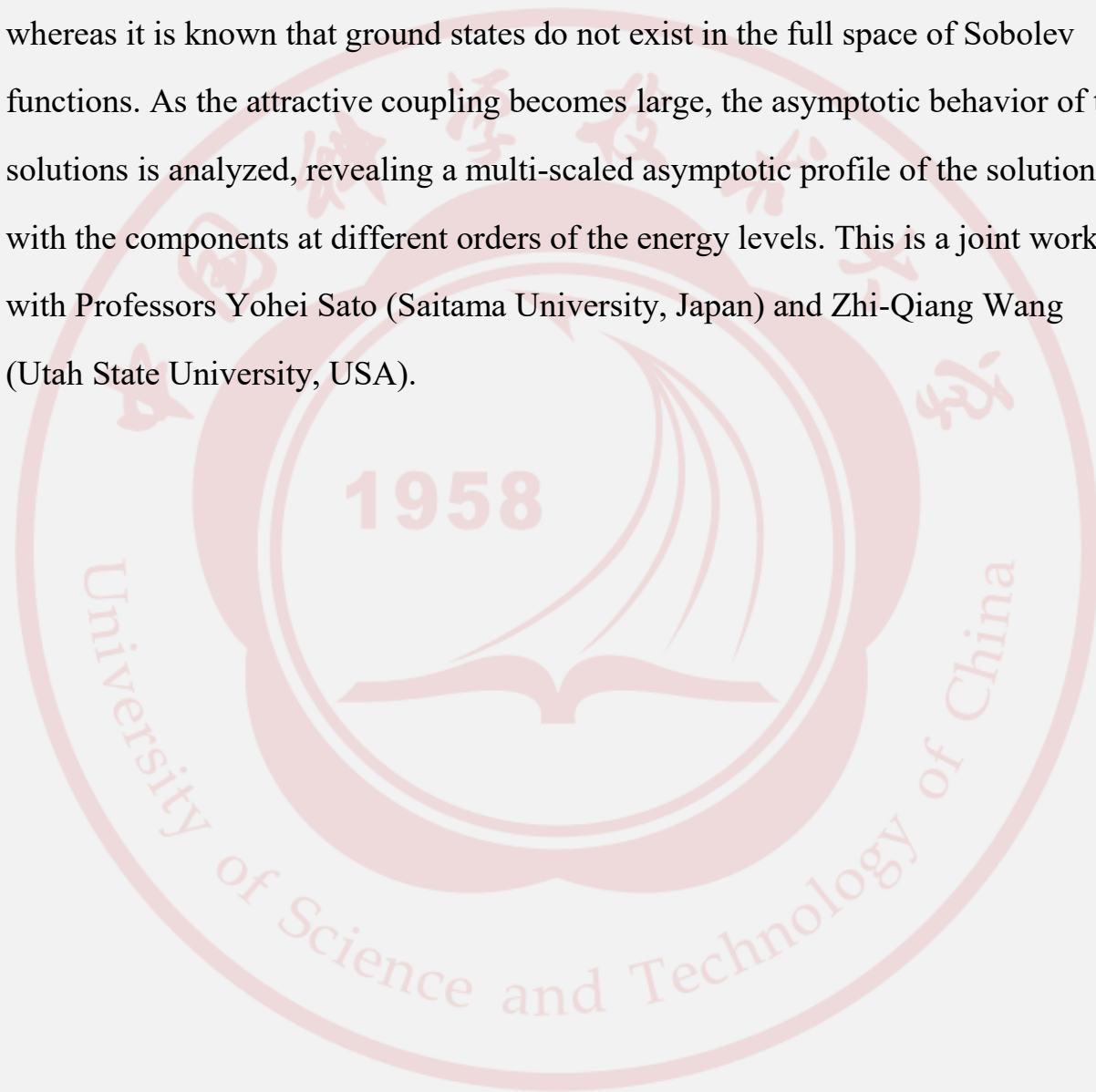
报告信息

题目: Non-radial positive solutions for nonlinear Schrödinger systems with mixed couplings

报告人: 夏健康, 西北工业大学

时间: 12月21日, 10:50-11:20

摘要: In this talk, I will present our recent results on bound state solutions for the coupled nonlinear elliptic system with mixed couplings. These solutions can be characterized as ground states within the subspace of even symmetric functions, whereas it is known that ground states do not exist in the full space of Sobolev functions. As the attractive coupling becomes large, the asymptotic behavior of the solutions is analyzed, revealing a multi-scaled asymptotic profile of the solution with the components at different orders of the energy levels. This is a joint work with Professors Yohei Sato (Saitama University, Japan) and Zhi-Qiang Wang (Utah State University, USA).





报告信息

题目: Blow-up Profiles and Types of Keller-Segel Model

报告人: 周茂林, 南开大学

时间: 12月21日, 11:25-11:55

摘要: In this talk, we will discuss the blow-up phenomena of Keller-Segel model, especially sharp description about the blow-up profiles and classify the blow-up types in higher dimensional cases..

题目: On Sharp Heisenberg Uncertainty Principle and the stability

报告人: 黄侠, 华东师范大学

时间: 12月21日, 14:00-14:30

摘要: In this talk, we summarize the linearization method to study the Heisenberg Uncertainty Principles, and explain that the same approach can be used to handle the stability problem. As examples of application, combining with spherical harmonic decomposition and the Hardy inequalities, we revise two families of inequalities. We give firstly an affirmative answer in dimension four to Cazacu-Flynn-Lam's conjecture [JFA, 2022] for the sharp Hydrogen Uncertainty Principle, and improve the recent estimates of Chen-Tang [arXiv:2508.15221v1] in \mathbb{R}^2 and \mathbb{R}^3 . On the other hand, we identify the best constants and extremal functions for two stability estimates associated to $\|\Delta u\|_2 \|r \nabla u\|_2 - \frac{N+2}{2} \|\nabla u\|_2^2$ in \mathbb{R}^N ($N \geq 2$), studied recently by Duong-Nguyen [CVPDE, 2025] and Do-Lam-Lu-Zhang [arXiv:2505.02758v1]. This is a joint work with Professor Dong YE at ECNU.



报告信息

题目: Asymptotic behavior of solutions to a free boundary model with seasonal succession

报告人: 孙宁奎, 山东师范大学

时间: 12月21日, 14:35-15:05

摘要: In this paper we consider the influence of seasonal succession on the dynamical behavior of solutions to a free boundary model with seasonal succession. We show that when $(1-\phi)\theta < \phi$, there is a spreading-vanishing dichotomy result; when $(1-\phi)\theta > \phi$, there is a spreading-transition-vanishing trichotomy result. We use the renormalization method to prove the existence and uniqueness of the T-periodic traveling semiwave. When spreading happens, we use the proved T-periodic traveling semiwave to characterize the precise profiles of solutions.



报告信息

题目：移动区域上的扩散模型及其风险刻画

报告人：林支桂，扬州大学

时间：12月21日，15:40-16:10

摘要：报告主要介绍几类具有自由边界的反应扩散问题。首先给出5种自由边界条件的推导；接着对自由变化区域上的 **Logistic** 种群扩散问题，给出扩张-灭绝二择一结果和扩张时的渐近速度；然后介绍自由变化区域上的脉冲扩散模型，给出时空风险指标；最后介绍描述西尼罗河病毒空间扩散的相关模型和结果。

题目：Boundedness in a two-dimensional doubly degenerate nutrient taxis system

报告人：李玉祥，东南大学

时间：12月21日，16:10-16:40

摘要：In this talk, we consider a no-flux initial-boundary value problem for the doubly degenerate nutrient taxis system in a smoothly bounded nonconvex domain. We prove that for all reasonably regular initial data, the problem possesses a global bounded weak solution. This work improves the previous works.