



華東師範大學
EAST CHINA NORMAL UNIVERSITY

偏微分方程及其应用

—— 青年学者研讨会



华东师范大学数学科学学院

中国·上海

2018年12月7日 — 12月9日

偏微分方程及其应用 — 青年学者研讨会

会议通知

“偏微分方程及其应用—青年学者研讨会”将于 2018 年 12 月 7 日至 12 月 9 日在华东师范大学数学科学学院召开。本次研讨会旨在加强国内偏微分方程及其相关领域的青年学者之间的联系，交流最新研究成果，促进彼此间的合作，研讨源于物理、几何、生物以及非线性分析中的前沿课题。

会议期间统一安排食宿，费用自理。

会议组织委员会：

王丽萍 赵纯奕 黄侠

会议报到：

会议将于 2018 年 12 月 7 日 14:00 到 21:00 在沪华国际大酒店大厅办理报到手续

酒店地址：上海市闵行区剑川路 368 号（021-64508999）

会议地点：

华东师范大学闵行校区数学楼 401 报告厅

联系信息：

王丽萍 15021735595 Email: lpwang@math.ecnu.edu.cn

赵纯奕 13564435712 Email: cyzhao@math.ecnu.edu.cn

黄侠 18801968278 Email: xhuang1209@gmail.com

会议日程

12月8日 地点：数学科学学院 401 报告厅

主持人	时间	报告信息
叶东	08:55—09:00	开幕式
徐露	09:00—09:40	Mean field equations on tori and the associated pre-modular forms 陈志杰 清华大学
	09:45—10:25	Bifurcation results of two semilinear elliptic equations 杜卓然 湖南大学
	10:25—10:55	照相 & 茶歇
王阳	10:55—11:35	Bound state solutions for the supercritical fractional Schrödinger equation 敖微微 武汉大学
	午餐	秋实阁二楼
李敬宇	13:30—14:10	Nonlocal power-type curvature flows of immersed locally curves 王小六 东南大学
	14:15—14:55	Blow-up phenomena for the constant scalar curvature and constant boundary mean curvature equation 陈学长 南京大学
	14:55—15:20	茶歇
向田	15:20—16:00	一种带有非局部吸收项目的退化抛物方程解的性态分析 白学利 西北工业大学
	16:05—16:45	Analysis on cross-diffusive SIS epidemic models 李慧聪 中山大学
	17:45 晚宴	沪华国际大酒店

12月9日 地点: 数学科学学院 401 报告厅

主持人	时间	报告信息
郭千桥	09:00—09:40	Clustering Phase Transition Layers with Boundary Intersection for an Inhomogeneous Allen-Cahn Equation 杨军 华中师范大学
	09:45—10:25	On the local uniqueness of the blow up solutions 杨文 中科院武汉物理与数学所
	10:25—10:45	茶歇
杨敏波	10:45—11:25	Study of some shallow water wave equations with peakons 魏龙 杭州电子科技大学
	11:30—12:10	New solutions for Neumann problems in \mathbb{R}^2 邓圣兵 西南大学
	午餐	秋实阁二楼
	下午	自由讨论

午餐地点: 秋实阁二楼 (数学科学学院对面)

8日晚宴地点: 沪华国际大酒店

报告摘要 (报告人字母序)

Bound state solutions for the supercritical fractional Schrödinger equation

敖微微 武汉大学

We prove the existence of positive solutions to the supercritical nonlinear fractional Schrodinger equation $(-\Delta)^s u + V(x)u - u^p = 0$ in R^n , with $u(x) \rightarrow 0$ as $|x| \rightarrow +\infty$, where $p > \frac{n+2s}{n-2s}$ for $s \in (0, 1)$, $2s < n$. We prove that if $V(x) = o(|x|^{-2s})$ as $|x| \rightarrow +\infty$, then for $p > \frac{n+2s-1}{n-2s-1}$, this problem admits a continuum of solutions. More generally, for $p > \frac{n+2s}{n-2s}$, conditions for solvability are also provided. This result is the extension of (Davila-Del Pino-Musso-Wei JDE 2007) to the fractional case. The main contributions for the fractional case are the existence of a smooth, radially symmetric, entire solution of $(-\Delta)^s w = w^p$ in R^n and the analysis of its properties. The difficulty here is the lack of phase - plane analysis for a nonlocal ODE; instead we use conformal geometry methods together with Schaaf's argument.

一种带有非局部吸收项目的退化抛物方程解的性态分析

白学利 西北工业大学

我们考虑一种描述二维简单闭合曲线的退化抛物方程，其中非局部项的出现，导致这一问题不满足比较原理。我们利用能量方法，LS 不等式等技巧，克服了这一困难。在适当范围内，给出了解的爆破条件和整体存在条件。进一步，对于任意整体有界的解，我们证明了它一定具有轨道收敛性。以上工作跟中山大学李芳副教授和东南大学王小六副教授共同合作完成。

Blow-up phenomena for the constant scalar curvature and constant boundary mean curvature equation

陈学长 南京大学

Inspired by the non-compact examples for the Yamabe equation due to Brendle, Brendle-Marques, we construct an example to show that the full set of the solutions to the constant scalar curvature and constant boundary mean curvature equation is non-compact. More precisely, for each fixed positive constant C , there exists an integer $n_0 = n_0(C) > 61$, when $n \geq n_0$, the aforementioned set for all conformal metrics with scalar curvature 1 and boundary mean curvature C is non-compact in C^0 -topology. This is joint with Nan Wu.

Mean field equations on tori and the associated pre-modular forms

陈志杰 清华大学

Let $E_\tau := \mathbb{C}/(\mathbb{Z} + \mathbb{Z}\tau)$ be a flat torus and consider the mean field equation with four singular sources:

$$\Delta u + e^u = 8\pi \sum_{k=0}^3 n_k \delta_{\frac{\omega_k}{2}} \quad \text{on } E_\tau, \quad (1)$$

where $\delta_{\omega_k/2}$ is the Dirac measure at $\frac{\omega_k}{2}$. The solvability of (1) essentially depends on the moduli τ in a sophisticated manner. In this talk, I will introduce a precise characterization of those τ 's in terms of zeros of pre-modular forms such that (1) has solutions on such E_τ . This is based on joint work with Prof. Chang-Shou Lin and Ting-Jung Kuo.

New solutions for Neumann problems in \mathbb{R}^2

邓圣兵 西南大学

In this talk, I will present some results about the existence of bubbling solutions for Neumann problems in \mathbb{R}^2 , which is related to the critical Trudinger-Moser trace inequality. In particular, we construct positive solutions for critical Neumann problem that concentrates around some points of the boundary. This is a joint work with M. Musso.

Bifurcation results of two semilinear elliptic equations

杜卓然 湖南大学

We consider the mean field equation on the unit sphere

$$\Delta_g u + \rho \left(\frac{e^u}{\int_{\mathbb{S}^2} e^u d\mu} - \frac{1}{4\pi} \right) = 0 \quad \text{in } \mathbb{S}^2,$$

where ρ is a real parameter. We obtain the existence of non-axially symmetric solutions bifurcating from $u = 0$ at the values $\rho = 4n(n+1)\pi$ for any odd integer $n \geq 3$, by using bifurcation theory. For Allen-Cahn equation involving fractional Laplacian, its all periodic solutions admit lower bound. By using bifurcation theory we prove that the lower bound of all periods is not larger than some exact positive constant. This is a joint work with Changfeng Gui, Jiaming Jin and Yuan Li.

Analysis on cross-diffusive SIS epidemic models

李慧聪 中山大学

We are concerned with two frequency-dependent SIS epidemic reaction-diffusion models in heterogeneous environment, with a cross-diffusion term modeling the effect that susceptible individuals tend to move away from higher concentration of infected individuals. It is first shown that the corresponding Neumann initial-boundary value problem possesses a unique global classical solution which is uniformly-in-time bounded in any spatial dimension. It is further shown that the models admit threshold-type dynamics in terms of the basic reproduction number. Our results on the asymptotic profiles of endemic equilibrium illustrate that restricting the motility of susceptible population may eliminate the infectious disease entirely for the model with constant total population but fails for the model with varying total population. In particular, this implies that such cross-diffusion does not contribute to the elimination of the infectious disease modelled by the second one.

Nonlocal power-type curvature flows of immersed locally curves

王小六 东南大学

We provide sufficient conditions on an initial curve for the area preserving and the length preserving curvature flows of curves in a plane, to develop a singularity at some finite time or converge to an m -fold circle as time goes to infinity. For the area-preserving flow, the positivity of the enclosed algebraic area determines whether the curvature blows up in finite time or not, while for the length-preserving flow, it is the positivity of an energy associated with initial curve that plays such a role.

Study of some shallow water wave equations with peakons

魏龙 杭州电子科技大学

In this talk, we consider the Cauchy problems of some shallow water wave equations with peakons. We focus on the local well-posedness, wave-breaking and persistence properties of these equations. Meanwhile, from the viewpoint of Lie symmetry analysis, we obtain some conserved quantities for these equations and present a general procedure of how these conserved quantities come about. Based on these conserved quantities, some analytical results are presented.

Clustering Phase Transition Layers with Boundary Intersection for an Inhomogeneous Allen-Cahn Equation

杨军 华中师范大学

We consider the nonlinear problem of inhomogeneous Allen - Cahn equation

$$\epsilon^2 \Delta u + V(y) (1 - u^2) u = 0 \quad \text{in } \Omega, \quad \frac{\partial u}{\partial \nu} = 0 \quad \text{on } \partial\Omega,$$

where Ω is a bounded domain in \mathbb{R}^2 with smooth boundary, ϵ is a small positive parameter, ν denotes the unit outward normal of $\partial\Omega$, V is a positive smooth function on $\bar{\Omega}$. Let Γ be a curve intersecting orthogonally with $\partial\Omega$ at exactly two points and dividing Ω into two parts, which satisfies *stationary and non - degeneracy conditions* with respect to the functional

$\int_{\Gamma} V^{1/2}$. We will show the existence of a solution u_{ϵ} with clustering transition layers near Γ with mutual distance $O(\epsilon|\log \epsilon|)$, provided that ϵ is small and away from a discrete set of values at which resonance occurs.

On the local uniqueness of the blow up solutions

杨文 中科院武汉物理与数学所

In this talk, we shall discuss the local uniqueness and non degeneracy results on the blow up solutions of the Mean Field equation. Based on these properties, we derive some conclusion about the Mean Field entropy and some symmetry result on the solution of the Mean Field equation on torus.

与会人员信息(姓氏拼音排序)

序号	姓名	单位	邮箱
1	敖微微	武汉大学	wwao@whu.edu.cn
2	白学利	西北工业大学	mybx1110@163.com
3	陈学长	南京大学	xuezhangchen@nju.edu.cn
4	陈志杰	清华大学	zjchen@math.tsinghua.edu.cn
5	崔仁浩	哈尔滨师范大学	renhaocui@163.com
6	邓圣兵	西南大学	shbdeng@swu.edu.cn
7	杜卓然	湖南大学	duzr@hnu.edu.cn
8	高俊磊	华东师范大学	gaojunlei123math@sina.com
9	郭千桥	西北工业大学	gqianqiao@nwpu.edu.cn
10	郭倩	华东师范大学	424096826@qq.com
11	韩敬文	华东师范大学	jwhan950106@126.com
12	胡良根	宁波大学	hulianggen@tom.com
13	黄侠	华东师范大学	xhuang1209@gmail.com
14	姜佳欣	华东师范大学	1187492182@qq.com
15	金伟	华东师范大学	jin_wei5@163.com
16	金云娟	华东师范大学	jjj0926@126.com
17	李芳	上海师范大学	lifwx@shnu.edu.cn
18	李芳	中山大学	lifang55@mail.sysu.edu.cn
19	李慧聪	中山大学	lihuicong@mail.sysu.edu.cn
20	李敬宇	东北师范大学	lijy645@nenu.edu.cn

序号	姓名	单位	邮箱
21	李震昊	华东师范大学	576739424@qq.com
22	刘萍	哈尔滨师范大学	liuping506@gmail.com
23	刘豫宁	上海纽约大学	yl67@nyu.edu
24	陆秋平	扬州大学	luqp2000@yahoo.ca
25	马宁	哈尔滨师范大学	
26	钮维生	安徽大学	niuwsh@ahu.edu.cn
27	潘兴斌	华东师范大学	xbpan@math.encu.edu.cn
28	皮慧荣	广西大学	huirongpi2001@163.com
29	秦增芸	华东师范大学	qinzengyun@126.com
30	孙中原	哈尔滨师范大学	
31	汤厚志	华东师范大学	houzhitang@163.com
32	王国爽	哈尔滨师范大学	
33	王金凤	哈尔滨师范大学	jinfengwangmath@163.com
34	王琦	上海理工大学	wangqi0168@126.com
35	王丽萍	华东师范大学	lpwang@math.ecnu.edu.cn
36	王伟宇	华东师范大学	545120271@qq.com
37	王小六	东南大学	xiaoliu_wang@139.com
38	王阳	杭州电子科技大学	yangwang79@126.com
39	王轶明	华东师范大学	51170601060@stu.ecnu.edu.cn
40	王中亮	第二军医大学	likemath@163.com
41	魏龙	杭州电子科技大学	alongwei@163.com

序号	姓名	单位	邮箱
42	吴伟	华东师范大学	1764341404@qq.com
43	向田	中国人民大学	txiang@ruc.edu.cn
44	项杏飞	同济大学	xiangxingfei@126.com
45	谢宇	华东师范大学	894500120@qq.com
46	徐露	湖南大学	xulu@hnu.edu.cn
47	严煜浩	华东师范大学	670180874@qq.com
48	杨军	华中师范大学	jyang@mail.ccnu.edu.cn
49	杨敏波	浙江师范大学	mbyang@zjnu.edu.cn
50	杨文	武汉物理数学所	math.yangwen@gmail.com
51	姚张锋	华东师范大学	2728178423@qq.com
52	叶东	华东师范大学	dye@math.ecnu.edu.cn
53	袁海荣	华东师范大学	hryuan@math.ecnu.edu.cn
54	张璐	华东师范大学	1076141752@qq.com
55	张亚萍	华东师范大学	2984296432@qq.com
56	张一平	华东师范大学	1197039885@qq.com
57	章志兵	安徽工业大学	zhibingzhang29@126.com
58	曾小雨	武汉理工大学	xyzeng@whut.edu.cn
59	赵纯奕	华东师范大学	cyzhao@math.ecnu.edu.cn
60	张艳艳	华东师范大学	yyzhang@math.ecnu.edu.cn
61	郑有泉	天津大学	zhengyq@tju.edu.cn
62	周风	华东师范大学	fzhou@math.ecnu.edu.cn