变分方法与非线性微分方程学术研讨会

会议时间：2022 年 5 月 6 日-7 日

会议地点：腾讯会议（会议号如下）

主办：福建师范大学数学与统计学院；福建省分析数学及应用重点实验室；福建省应用数学中心（福建师范大学）；福建师范大学数学研究中心

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报告安排

时间	报告人	报告题目	主持人
5.6 下午	腾讯会议号： 251 980 606（密码：0506）		
2:10-2:15	开幕		陈建清
2:15-2:55	邹文明（清华大学）		
2:55-3:35	罗鹏(华中师范大学)	The critical points of Robin function and Kirchhoff-Routh function	
休息 10 分钟			
3:45-4:25	章国庆（上海理工大学）	Normalized Ground State Traveling Solitary Waves for the Half-Wave Equations with Combined Nonlinearities	钟延生
4:25-5:05	姬超（华东理工大学）	Some results on the nonlinear logarithmic Schrodinger equations	
5.7 上午	腾讯会议号：773 489 452 （密码：0507）		
8:20-9:00	唐春雷（西南大学）	**Least energy sign-changing solutions for Schrodinger-Poisson system**	曾晶
9:00-9:40	贺小明（中央民族大学）	Some results for fractional Schrodinger-Poisson systems with nonlocal critical exponents	
9:40-10:20	唐仲伟（北京师范大学）	Compactness of solutions to higher order elliptic equations	
休息 10 分钟			
10:30-11:10	唐先华（中南大学）	平面上具临界指数增长的 Hamilton 系统	梁四化
11:10-11:50	徐桂香（北京师	Minimal mass blow-up solutions	

	范大学）	for the L^2-critical NLS with the Delta potentia	
午间休息			
5.7 下午	腾讯会议号：773 489 452 （密码：0507）		
2:10-2:50	贾高（上海理工大学）	Existence and behavior of positive solution for a class of quasilinear elliptic problems with discontinuous nonlinearity	黄晨
2:50-3:30	张彬林（山东科技大学）	Some fractional Laplacian problems via fixed point theorem	
休息 10 分钟			
3:40-4:20	张建军（重庆交通大学）	A global branch approach to normalized solutions for Schrodinger equations	冯伟杰
4:20-5:00	刘轼波（厦门大学）	Quasilinear schrodinger equations with indefinite potentials	
5:00-5:05	闭幕		

报告题目和摘要（按报告人姓氏拼音顺序）

2022 年 5 月 6 日下午-7 日

报告人：贺小明（中央民族大学）

题目：Some results for fractional Schrodinger-Poisson systems with nonlocal critical exponents

摘要：In this topic, we first recall some known results for the fractional Schrodinger-Poisson systems; then we give some new existence and multiplicity results for fractional Schrodinger-Poisson system with nonlocal critical term. The proof of the main results is variational, the arguments are involved with the Nehari manifold method, global compactness principle, compactness analysis and energy estimation.

报告人：姬超（华东理工大学）

题目：Some results on the nonlinear logarithmic Schrodinger equations

摘要：In this talk, we are concerned with the nonlinear logaritimic Schrodinger equations. When the potential satisfies a global assumption, we give the multiple solutions. When the potential satisfies a local assumption, due to del Pino and Felmer, we consider the existence and concentration of positive solutions. Then, based on some new estimates from previous research, the multi-bump solutions are obtained for a logarithmic Schrodinger equation with deepening potential well. Finally, we shall show the multiplicity of multi-peak positive solutions for the logarithmic Schrodinger equation with a multi-well potential. This talk is based on joint works with Professor Claudianor O. Alves.

报告人：贾高（上海理工大学）

题目：Existence and behavior of positive solution for a class of quasilinear elliptic problems with discontinuous nonlinearity

摘要：In this talk, we present the existence and behavior of positive solutions of the following quasilinear elliptic problems with discontinuous nonlinearities:

$$-\Delta u + V(x)u - \kappa u\Delta(u^2) = H(u-\delta)f(x,u), x \in \mathbb{R}^N, u \in D^{1,2}(\mathbb{R}^N) \cap W_{loc}^{2,2}(\mathbb{R}^N), \qquad (P_\delta)$$

where $\delta, \kappa > 0, N \geq 3, V: \mathbb{R}^N \to \mathbb{R}$ is a nonnegative continuous function, which can vanish at infinity, that is, $V(x) \to 0$ as $|x| \to \infty, f: \mathbb{R}^N \times \mathbb{R} \to \mathbb{R}$ is a Caratheodory function and H is the Heavside function. Via a suitable nonsmooth truncation, we apply the penalization method combined with the Mountain Pass Theorem for locally Lipschitz functional to obtain a positive solution u_δ of (P_δ) for all $\delta > 0$. Furthermore, we establish the convergent behavior of positive solution sequence $\{u_\delta\}$, that is, $u_\delta \to u_0$ in $D^{1,2}(\mathbb{R}^N)$ as $\delta \to 0^+$, where u_0 is a positive solution of (P_0).

报告人：刘轼波（厦门大学）

题目：Quasilinear schrodinger equations with indefinite potentials

摘要：We study quasilinear Schrodinger equations of the form

$$-\Delta u + V(x)u - u\Delta(u^2) = g(u),$$

Where V is coercive and sign-changing, g is 3-superlinear and verifies the monotonicity condition that $g(t)/|t|^3$ is non decreasing on $(-\infty, 0)$ and $(0, \infty)$. Local linking and Morse theory are applied to get nontrivial solutions.

报告人：罗鹏（华中师范大学）

题目：The critical points of Robin function and Kirchhoff-Routh function

摘要： The properties of Robin function and Kirchhoff-Routh function play a very basic role in the study of elliptic equation, fluid mechanics, dynamic system, geometry and topology, etc. However, the property of the critical point is still unclear for large class of domains. In this talk, we give some results on the number of non-degeneracy of critical pints of Robin function and Kirchhoff-Routh function. These are joint work with Francesca Gladiali, Massimo Grossi, Peng Luo, Shusen Yan.

报告人：唐春雷（西南大学）

题目：Least energy sign-changing solutions for Schr\"{o}dinger-Poisson system

摘要：In this talk, we will discuss the following Schr\"{o}dinger-Poisson system

\begin{equation*}
\begin{cases}
 -\Delta u+V(x)u+K(x)\phi u = f(x,u),\\ \   &\ x \in \mathbb{R}^{3},\\[2mm]
 -\Delta \phi=K(x)u^2, \\ \   &\ x \in \mathbb{R}^{3}.\\
\end{cases}
\end{equation*}

Some background knowledge is introduced about Schr\"{o}dinger-Poisson system firstly. Then, under various assumptions on $V(x),\,K(x)$ and $f(x,u)$, we will present some recent results about the existence of least energy   sign-changing solutions for above system.

报告人：唐先华、中南大学

题目：平面上具临界指数增长的 Hamilton 系统

摘要：主要介绍平面上具临界指数增长的 Hamilton 系统非平凡解和基态解存在性相关结论。

唐仲伟（北京师范大学）

题目：Compactness of solutions to higher order elliptic equations

摘要：In this talk, I will present some our recent work about the compactness of high order elliptic equations. We use blow up analysis for local integral equations to prove compactness of solutions to higher order critical elliptic equations provided the potentials only have non-degenerate zeros. Secondly, corresponding to Schoen's Weyl tensor vanishing conjecture for the Yamabe equation on manifolds, we establish a Laplacian vanishing rate of the potentials

at blow up points of solutions. This is a jiont work with Miaomiao Niu and Ning Zhou.

报告人：徐桂香（北京师范大学）

题目：Minimal mass blow-up solutions for the L^2-critical NLS with the Delta potentia

摘要：We consider the L^2-critical nonlinear Schr\"odinger equation (NLS) with the delta potential

$$i\partial_tu +\partial^2_x u + \mu \delta u +|u|^{4}u=0, \, \, t\in \R, \, x\in \R , $$

where $ \mu \in \R$, and δ is the Dirac delta distribution at $x=0$. Local well-posedness theory together with sharp Gagliardo-Nirenberg inequality and the conservation laws of mass and energy implies that the solution with mass less than $\|Q\|_{2}$ is global existence in $H^1(\R)$, where Q is the ground state of the L^2-critical NLS without the delta potential (i.e. $\mu=0$).

We are interested in the dynamics of the solution with threshold mass $\|u_0\|_{2}=\|Q\|_{2}$ in $H^1(\R)$. First, for the case $\mu=0$, such blow-up solution exists due to the pseudo-conformal symmetry of the equation, and is unique up to the symmetries of the equation in $H^1(\R)$ from \cite{Me93:NLS:mini sol} (see also \cite{HmKe05:NLS:mini blp}), and recently in $L^2(\R)$ from \cite{Dod:NLS:L2thrh1}. Second, for the case $\mu<0$, simple variational argument with the conservation laws of mass and energy implies that radial solutions with threshold mass exist globally in $H^1(\R)$. Last, for the case $\mu>0$, we show the existence of radial threshold solutions with blow-up speed determined by the sign (i.e. $\mu>0$) of the delta potential perturbation since the refined blow-up profile to the rescaled equation is stable in a precise sense. The key ingredients here including the Energy-Morawetz argument and compactness method as well as the standard modulation analysis. It is a joint work with Xingdong Tang.

报告人：张彬林（山东科技大学）

题目： Some fractional Laplacian problems via fixed point theorem

摘要：In this talk, we present some recent existence results on fractional Laplacian equations and systems via a fixed point result. It is worth pointing out that this approach do not require to overcome the lack of compactness when dealing with some fractional problems involving some critical exponents by variational

methods. Moreover, compared with the existing results in the Laplacian setting, the nonlinearities may be more general. This is a joint work with Mengfei Tao.

报告人：章国庆（上海理工大学）

题目：Normalized Ground State Traveling Solitary Waves for the Half-Wave Equations with Combined Nonlinearities

摘要：

Abstract. In this paper, we consider the half-wave equations with combined power nonlinearities

$$i\partial_t u = \sqrt{-\Delta}\, u - \mu \left| u \right|^{q-1} u - \left| u \right|^{p-1} u, \ (t, x) \in \mathbb{R} \times \mathbb{R}^d,$$

where $d \geq 2$, $\mu \in \mathbb{R}$ and $1 < q < p < 1 + \frac{2}{d-1}$. We study traveling solitary waves of the form

$$u(x, t) = e^{i\omega t} Q(x - vt),$$

with frequency $w \in \mathbb{R}$, and velocity $v \in \mathbb{R}^d$. As $|v| \geqslant 1$, we establish a general non-existence of traveling solitary waves by using Riesz transforms and a virial-type identity. As $0 < |v| < 1$, under different assumptions on $q < p$, we prove several existence results for traveling solitary waves. In particular, we consider cases when

$$1 < q < 1 + \frac{2}{d} < p < 1 + \frac{2}{d-1},$$

i.e., the two nonlinearities have different character with respect to the L^2-critical exponent. Note that such traveling solitary waves Q is not radially symmetric in $x \in \mathbb{R}^d$, and we need to overcome the lack of compactness and obtain the existence of mountain-pass type solution and saddle type solution. In addition, based on the existence and properties of traveling solitary waves, we also prove that small data scattering fails to hold for the nonlinear half-wave equations.

报告人：张建军 （重庆交通大学）

题目：A global branch approach to normalized solutions for Schrodinger equations

摘要：In this talk, we present a novel approach to study the existence, non-existence and multiplicity of prescribed mass positive solutions to a Schrodinger equation of the form

$$-\Delta u + \lambda u = g(u), u \in H^1(\mathbb{R}^N), N \geq 1.$$

This approach permits to handle in a unified way nonlinearities which are either mass subcritical, mass critical or mass supercritical. Among its main ingredients is the study of the asymptotic behaviors of the positive solutions as $\lambda \to 0^+$ or $\lambda \to \infty$ and the existence of an unbounded continuum of solutions in $(0, \infty) \times H^1(\mathbb{R}^N)$. This is based on a joint work with Prof. Louis Jeanjean and Prof. Xuexiu Zhong

报告人：邹文明（清华大学）

题目：

摘要：