



西安交通大学
XI'AN JIAOTONG UNIVERSITY

非线性泛函分析与偏微分方程 研讨会

程序册



西安交通大学数学与统计学院

2023年7月31日-8月2日

非线性泛函分析与偏微分方程研讨会

会议主题：本次研讨会旨在加强非线性泛函分析、无穷维动力系统与偏微分方程等相关领域专家学者之间的交流与合作，分享相关领域的最新研究成果，进一步探讨偏微分方程等学科的科研前沿问题。学术会议的主题涉及无穷维动力系统吸引子问题、偏微分方程的最优控制问题、非线性色散方程的相关问题等。

主办单位：西安交通大学数学与统计学院

组委会：尤波 西安交通大学

李芳 西安电子科技大学

会议资助：国家自然科学基金天元数学讲习班项目

会议地点：陕西省，西安市，高速神州酒店

报到时间：2023年7月31日 14:00--20:00

会议安排：

日期	会议安排
2023年7月31日	注册报到
2023年8月1-2日	学术报告
2023年8月3日	自由讨论、离会

会议联系人：尤波 18629384684 youb2013@xjtu.edu.cn

邀请专家名单

(按姓氏排序)

姓名	工作单位	姓名	工作单位
崔洪勇	华中科技大学	马如云	西安电子科技大学
窦芳芳	电子科技大学	秦玉明	东华大学
冯斌华	西北师范大学	孙春友	兰州大学
高洪俊	东南大学	王 明	中国地质大学(武汉)
郭玉劲	华中师范大学	徐 饶	中国科学院大学
李新华	兰州大学	杨志坚	郑州大学
刘存才	江苏理工学院	钟承奎	南京大学
刘彦麟	北京师范大学	张军勇	北京理工大学
吕 琦	四川大学	郑继强	北京应用物理与计算 数学研究所

非线性泛函分析与偏微分方程学术会议日程安排				
8月1日 08:30-09:00			开幕式及照相	
8月1日			8月2日	
时间	报告人	主持人	报告人	主持人
09:00-09:40	郭玉劲	钟承奎	王明	高洪俊
09:40-10:20	吕琦		冯斌华	
10:20-10:40	茶歇		茶歇	
10:40-11:20	张军勇	马如云	徐饶	秦玉明
11:20-12:00	窦芳芳		刘存才	
12:00-14:30	午餐		午餐	
时间	报告人	主持人	自由讨论	
14:30-15:10	郑继强	张军勇		
15:10-15:50	刘彦麟			
15:50-16:10	茶歇			
16:10-16:50	崔洪勇	杨志坚		
16:50-17:30	李新华			

Forward attraction of non-autonomous dynamical systems

崔洪勇
华中科技大学

We shall talk about the attractor theory for non-autonomous dynamical systems. Firstly we show some examples to see what a “forward attractor” can be, and then, secondly, we discuss several possible candidates of forward attractors, including forward attracting pullback attractor, Vishik’s uniform attractor, and finally we introduce a forward attractor that is in general smaller than Vishik’s uniform attractor.

Global Carleman estimate and state observation problem for Ginzburg-Landau equation

窦芳芳
电子科技大学

This talk prove a global Carleman estimate for the complex Ginzburg-Landau operator with a cubic nonlinear term in a bounded domain of \mathbb{R}^n , $n = 2, 3$. Moreover, as applications, state observation problems for the Ginzburg-Landau equation is proven.

Optimal bilinear control of two classes Schrodinger equations

冯斌华
西北师范大学

In this talk, we will talk optimal bilinear control problems for the Gross-Pitaevskii equations with Coulombian potentials and X-ray free electron laser Schrodinger equation. We show the well-posedness of the problem and the existence of an optimal control. In addition, the first order optimality system is rigorously derived. In particular, we prove the Fréchet-differentiability of the unconstrained functional.

Properties of Ground States for Rotating Bose-Einstein Condensates: Both the Repulsive and Attractive Cases

郭玉劲
华中师范大学

In this talk, we focus on the analytical properties of ground states for the planar Bose-Einstein condensates in a rotating trap, where the interactions of the condensates can be either

repulsive or attractive. The existence of ground states is classified in terms of the rotational speed and as well the strength of interactions. We further prove in a uniform approach that up to a constant phase, ground states must be real-valued, unique, and free of vortices if the rotational speed is small sufficiently.

Exponential dissipation for the wave equations with degenerated damping

李新华
兰州大学

In this talk, we investigate the dissipation for the wave equation with localized and degenerated damping. In contrast to the classical geometric control condition (GCC), we give the integral control condition (ICC) which means the damping coefficient has a positive lower bound in the sense of integral. Our main results reveal that some wave models are exponentially dissipative under ICC and some auxiliary conditions.

On long-term behavior of wave equation with nonlinear damping and super-cubic nonlinearity

刘存才
江苏理工学院

In this talk, we will give some results on the semilinear wave equation involving the nonlinear damping and nonlinearity. By choosing a nonlinear test function, we can establish a space-time estimate for the weak solution. Then, under a wider range of growth condition of nonlinearity, the well-posedness of the weak solution is achieved. And the existence of a global attractor is obtained via energy method. Furthermore, we derive that the global attractor is bounded in $(H^2(\Omega) \cap H_0^1(\Omega)) \times H_0^1(\Omega)$.

The global stability of large Fourier mode for 3-D Navier-Stokes equations in the cylindrical coordinates

刘彦麟
北京师范大学

We intend to study 3-D incompressible Navier-Stokes equations in the cylindrical coordinates. Here we do not limit us in the classical axisymmetric case, but the axisymmetric structure still plays a key role. For general initial data, we can expand them into Fourier series in θ variable. In particular, we prove the global existence of strong solutions if the initial data is of the form: $A(r, z) \cos N\theta + B(r, z) \sin N\theta$, provided that N is large enough. This is based

on joint works with Ping Zhang.

Linear quadratic optimal control problem for stochastic evolution equations

吕琦

四川大学

Linear quadratic optimal control problem is one of the fundamental problems in Control Theory. It is well studied for systems governed by ordinary/partial/stochastic differential equations. In this talk, we first recall the development of LQ problems briefly. Then we present some recent progresses on this problem for stochastic evolution equations.

KdV 方程的长时间解析半径下界

王明

中国地质大学 (武汉)

KdV 方程在 Sobolev 空间中适定性已基本清楚，但在解析函数空间中的整体适定性仍是待解决问题。具体来说需要证明，如果初值具有某个解析半径时，那么 KdV 方程的解在任意时刻仍然具有同样的解析半径。当时间趋于无穷时，文献给出的最佳解析半径下界是 $t^{-4/3}$ 。我们通过建立高阶能量守恒率，给出新的衰减下界 $t^{-1/4}$ 。同时，如果 KdV 方程具有某种耗散效应，那么解析半径具有一致固定正下界。

On a class of nonlocal degenerate parabolic equations

徐饶

中国科学院大学

In this talk, we present the recent work on a class of nonlocal degenerate parabolic equations with Kirchhoff coefficients. The well-posedness is established under almost sharp assumptions and the global attractor as well as the features of its dimension is discussed. This work is joint with Zhijun Tang and Chengkui Zhong.

Nonlinear Helmholtz eigenfunctions via Fredholm theory

张军勇

北京理工大学

In this talk, we talk about the Fredholm estimate and use this estimate to prove the property of the eigenfunctions. This talk is based on a joint paper with Jesse Gell-Redman, Andrew Hassell and Jacob Shapiro.

Growth of Sobolev norms for 2d cubic NLS with partial harmonic potential

郑继强

北京应用物理与计算数学研究所

In this talk, we study the 2D cubic nonlinear Schrödinger equation (NLS) with the partial harmonic potential. First, we prove the local well-posedness in Bourgain spaces by establishing a key bilinear estimate associated with the partial harmonic oscillator. Then, we give the polynomial bound of the Sobolev norms for the solutions using the method of the Planchon, Tzvetkov, and Visciglia. This work is jointed with Mingming Deng and Xiaoyan Su.