Workshop on Nonlinear Partial Differential Equations IX

Oct. 30-Nov. 1, 2020

1. Workshop Information

Announcement:

In order to enhance the communications among the mathematicians on the subject of partial differential equations, geometric analysis and related topics, we plan to hold "Workshop on nonlinear partial differential equations IX" on Oct. 30-Nov. 1, 2020. We will invite some experts to share ideas and results on recent research, and discuss current challenging issues.

Organizing Committee:

Congming Li, Shanghai Jiao Tong University
Yutian Lei, Nanjing Normal University
Yingshu Lü, Fudan University
Leyun Wu, Shanghai Jiao Tong University
Chunqin Zhou, Shanghai Jiao Tong University

Venues:

Room 901, No. 6 Building, Science Buildings
Minhang Campus
Shanghai Jiao Tong University
800 Dongchuan Road

Hotel:

Redding Mann Hotel
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Contact Us

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2. Schedule

Oct. 31, Saturday：Room 901, No. 6 Building, Science Buildings	
Forenoon	
8：50-9：00	Opening ceremony
Chair: Zhongxue Lü	
9：00-10：00	Speaker: Jingang Xiong Title: Regularity and extinction profiles of solutions to fast diffusions equations in bounded domains
10：00-10：40	Tea break(Take a group photo)
10：40-11：40	Speaker: Yuhua Sun Title: Volume growth and elliptic differential inequalities on manifolds
11：40-14：00	Lunch
Afternoon	
Chair: Yutian Lei	
14：00-15：00	Speaker: Cheng Zheng Title: Dynamical properties of homogeneous flows and Diophantine approximation
15：00-15：30	Tea break
15：30-16：30	Speaker: Wei Wei Title: Uniqueness of \sigma_{2}-yamabe problem in four-manifolds with umbilic boundary
16：30-17：30	Speaker: Tingzhi Cheng Title: Monotonicity results to fractional cooperative systems in half space
17：30-18：00	Free discussion
18:30	Banquet

3. Titles and Abstracts

Regularity and extinction profiles of solutions to fast diffusions equations in bounded domains

Speaker: Jingang Xiong (Beijing Normal University)

I will talk about the optimal boundary regularity of solutions to the fast diffusions equations, solving an open problem of Berryman-Holland 1980 in the subcritical and critical regimes. Based on this regularity and blow up analysis, extinction behavior will be presented. This is joint with T. Jin.

Volume growth and elliptic differential inequalities on manifolds

Speaker: Yuhua Sun (Nankai University)

We would present some results how volume growth affects the existence and nonexistence of elliptic differential inequalities on manifolds. This talk is based on a series of papers joint with A. Grigor'yan, I. Verbitsky, F. Xu, L. Wang.

Dynamical properties of homogeneous flows and Diophantine approximation

Speaker: Cheng Zheng(Shanghai Jiao Tong University)

We will give an introduction to homogeneous dynamics and briefly review some aspects of this subject, exhibiting their connections to Diophantine approximation. Then we will discuss a joint work with C.D. Buenger about non-divergence of unipotent flows for infinite-volume

homogeneous spaces, which extends a result of Kleinbock and Margulis. We will also discuss a result regarding Hausdorff dimensions of Diophantine sets for Diophantine approximation on Heisenberg groups.

Uniqueness of σ_{2}-yamabe problem in four-manifolds with umbilic boundary

Speaker: Wei Wei (Fudan University)

By a priori estimates, we obtain the existence of the Gursky-Streets equation with Neumann boundary on (X,M,g), for $2\le k\le n\$,begin{cases}u_{tt}\sigma_{k}(g_{u}^{-1}A_{g_{u}})=<T_{k-1}^{g_{u}},\nabla u_{t}\otimes\nabla u_{t}> & X\times[0,1]\\\partial_{n}u+h_{g}=0 & M\times[0,1],\end{cases}where M is umbilic boundary L_{g}=h_{g}\cdot g and weakly convex h_{g}\ge0. As an application, we obtain the uniqueness of the solution u to\begin{cases}\sigma_{2}(g_{u}^{-1}A_{g_{u}})=constant & X\\h_{g_{u}}=0 & M\end{cases}where $g_{u}=e^{-2u}g$, X is not conformal to hemi-sphere and M is weakly convex umbilic boundary.

Monotonicity results to fractional cooperative systems in half space

Speaker: Tingzhi Cheng(Ludong University)

In this talk, we mainly discuss the monotonicity results of nonnegative bounded solutions to the following fractional Laplacian system in half space

$$\begin{cases} (-\Delta)^{\frac{\alpha}{2}} u(x) = f(u,v) \\ (-\Delta)^{\frac{\alpha}{2}} v(x) = g(u,v), \quad x \in R_+^n \\ \\ u(x) = v(x) \equiv 0, x \in R^n \setminus R_+^n \end{cases}$$

where $f_v \geq 0, g_u \geq 0$. We first review some monotonicity results of the classical elliptic system in half space, then we will extend the results to the corresponding fractional Laplacian system.

4. List of Participants

Name	Affiliation
程廷治	鲁东大学
雷雨田	南京师范大学
吕英姝	复旦大学
吕中学	江苏师范大学
牛亚婷	复旦大学
孙玉华	南开大学
王小龙	东华理工大学
韦韡	复旦大学
熊金刚	北京师范大学
张涛	烟台大学
周长亮	东华理工大学
来米加	上海交通大学
李从明	上海交通大学
李振杰	上海交通大学
廉媛媛	上海交通大学
王芳	上海交通大学
王邵东	上海交通大学
武乐云	上海交通大学
郑骋	上海交通大学
周春琴	上海交通大学
卓然	上海交通大学
梁警琦	上海交通大学
刘宸恺	上海交通大学
徐美清	上海交通大学
王丽丹	上海交通大学
周辉煌	上海交通大学

Remark：

For convenience of young mathematicians and students, we arrange the one-hour-talk for speakers. We suggest strongly that each talk can conclude the part of the histories and the results of the research together with one detailed technique of solving the problem. Each speaker can use "ppt" for your talk. But we suggest strongly that the ppt is just for the histories and the results of the research, while the detailed technique can be shown on the blackboard.