The 11th East Asian conference in Harmonic Analysis and Applications

Date: August 15 (Thur.) - 19 (Mon.), 2024
Place: 5th floor of International Science Innovation Building (No. 69), Kyoto University Access

– – –Abstracts of the talks on 16th – – –

Plenary talks: 50 min.

- Koichi Taniguchi, (Shizuoka University),
  Date: 16th 10:00 - 10:50.
  - Title: *On characterization of boundedness of composition operators on Besov spaces.*
  - Abstract: We consider the boundedness of composition operators on Besov spaces $B^s_{p,q}$. While the boundedness has been studied for the lower order case $0 < s < 1$, there are few results for the higher order case $s > 1$. In this talk, we discuss the boundedness for inhomogeneous Besov spaces on one dimensional Euclidean space in the higher order case and provide its necessary and sufficient conditions. The key point of the proof is to reveal a relation between the composition operators and pointwise multiplication operators of Besov spaces, where the characterizations of the pointwise multipliers are effectively used. This talk is based on a joint work with Isao Ishikawa (Ehime University) and Masahiro Ikeda (RIKEN / Keio University).
- Xiangxing Tao, (Zhejiang University of Science and Technology),
  Date: 16th 16:10 - 17:00.
  - Title: *On the Tb theorem for some singular integral operators over space of homogeneous type.*
  - Abstract: We will discuss and establish the Tb theorems for the boundedness of the Calderón-Zygmund singular integral operator with non-convolution kernel on these new inhomogeneous Besov and Triebel-Lizorkin spaces. We will also introduce the $T1$ theorem for generalized non-standard singular integrals with product kernels associated to mixed homogeneities, which extends those non-standard convolution singular integrals introduced by Phong and Stein. This is a joint work with Y. Han, S. Krantz, T. Zheng, etc.

Talks: 30 min.

- Yanping Chen, (University of Science and Technology Beijing), Date: 16th 11:10 - 11:40.
  - Title: *An extension of Calderón-Zygmund type singular integral with non-smooth kernel.*
  - Abstract: This talk is concerned with a kind of singular integrals which can be viewed as an extension of the classical Calderón-Zygmund type singular integral. This kind of singular integrals appears in the SQG equation.
- Sukjung Hwang, (Chungbuk National University), Date: 16th 11:10 - 11:40.
  - Title: *Nonlinear diffusion equation with a divergence form of drift.*
  - Abstract: In this talk, we introduce recent results of the porous medium (PME) and fast diffusion equation (FDE) with a divergence form of drifts that can apply to certain reaction-diffusion equations including the Keller-Segel model. One of the main ingredients is understanding appropriate functional classes of drifts determined by nonlinear diffusion and initial data.

$---$break$---$

- Yohei Tsutsui, (Kyoto University), Date: 16th 12:00 - 12:30.
  - Title: *Two-weight inequality for the heat flow and solvability of Hardy-Hénon parabolic equation.*
  - Abstract: We provide two-weight inequalities for the heat flow on the whole space by applying the sparse domination and a result by Fackler-Hytönen. Then, we consider the local and global existence of solutions to Hardy-Hénon parabolic equation, which has a potential belonging to a Muckenhoupt class.
- Maochun Zhu, (Nanjing University of Science and Technology), Date: 16th 12:00 - 12:30.
  - Title: *Existence of ground state solutions for nonlinear PDEs with exponential critical growth involving the constant and trapping potentials.*
  - Abstract: In this talk we will present our recent work concerning the existence of ground state solutions for nonlinear PDEs with exponential critical growth involving the constant and trapping potentials. Assume that the nonlinearity $f(t)$ has critical exponential growth at infinity which is given by the Adams inequalities, that is, there exists some $\alpha_0 > 0$ such that

$$\lim_{t\to\infty} \frac{f(t)}{e^{\alpha t^2}} = \begin{cases} 0, & \text{if } \alpha > \alpha_0, \\ +\infty, & \text{if } \alpha < \alpha_0, \end{cases}$$

    we prove the existence of ground state solutions for bi-harmonic equations

$$\Delta^2 u + V(x)u = f(u) \quad \text{in } \mathbb{R}^4$$

    when $V(x)$ is the constant potentials or trapping potential:

$$0 < \gamma < \inf_{x\in\mathbb{R}^4} V(x) < \lim_{|x|\to\infty} V(x) = \tau.$$

Furthermore, we discuss existence of ground state solutions for sub-Laplacian Schröodinger equation with exponential critical growth which is given by the Trudinger-Moser inequalities on the the n-dimensional Heisenberg group H_n,

$$-div_H(|\nabla_H u|^{Q-2}\nabla_H u) + V(x)u = f(u) \quad \text{in } H_n.$$

when $V(x)$ is the constant potentials or trapping potential. This part of the talk is based on joint work with Guozhen Lu and Lu Chen.

$---$Lunch break$---$

- Chu-Hee Cho, (Seoul National University),
  Date: 16th 14:30 - 15:00.
  - Title: *Bourgain's counterexample in the sequential convergence problem for the Schrödinger equation.*
  - Abstract: We study the problem of pointwise convergence for the Schrödinger operator on $\mathbb{R}^n$ along time sequences. We show that the sharp counterexample to the sequential Schrödinger maximal estimate given recently by Li, Wang and Yan based in the construction by Luc and Rogers can also be achieved with the construction of Bourgain, and we extend it to the fractal setting. This talk is based on the joint work with Daniel Eceizabarrena.
- Kotaro Inami, (Nagoya University),
  Date: 16th 14:30 - 15:00.
  - Title: *Local L^p smoothing estimates for Schrödinger equations in modulation spaces.*
  - Abstract: The local smoothing estimate for Schrödinger equations in modulation spaces is first introduced by Schippa(2022). Schippa proved it via ℓ^2 decoupling inequality. We show a new local smoothing estimate in modulation spaces in one-dimensional cases using the Córdoba-Fefferman type L^4 reverse square function estimate.

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- Naoto Shida, (Nagoya University),
  Date: 16th 15:20 - 15:50.
  - Title: *Bilinear oscillatory Fourier multipliers.*
  - Abstract: In this talk, we consider bilinear Fourier multipliers that contain some oscillatory factors. In particular, we consider the boundedness of these operators between Lebesgue spaces including endpoint cases. Our results improve Bergfeldt, Rodriguez-Lopez, Rule and Staubach's results for the case of bilinear Fourier multiplier operators. This talk is based on a joint work with Tomoya Kato, Akihiko Miyachi and Naohito Tomita.
- Changkeun Oh, (Seoul National University),
  Date: 16th 15:20 - 15:50.
  - Title: *On the small cap decoupling for the moment curve in $\mathbb{R}^3$.*
  - Abstract: In this talk, I'll introduce exponential sum estimates, and present recent work on the small cap decoupling for the moment curve in $\mathbb{R}^3$. This is joint work with Dominique Maldague.