Abstract Harmonic Analysis 2009

National Sun Yat-sen University
台灣・高雄・中山大學
Kaohsiung, Taiwan.

December 18-22, 2009

University Library 11/F

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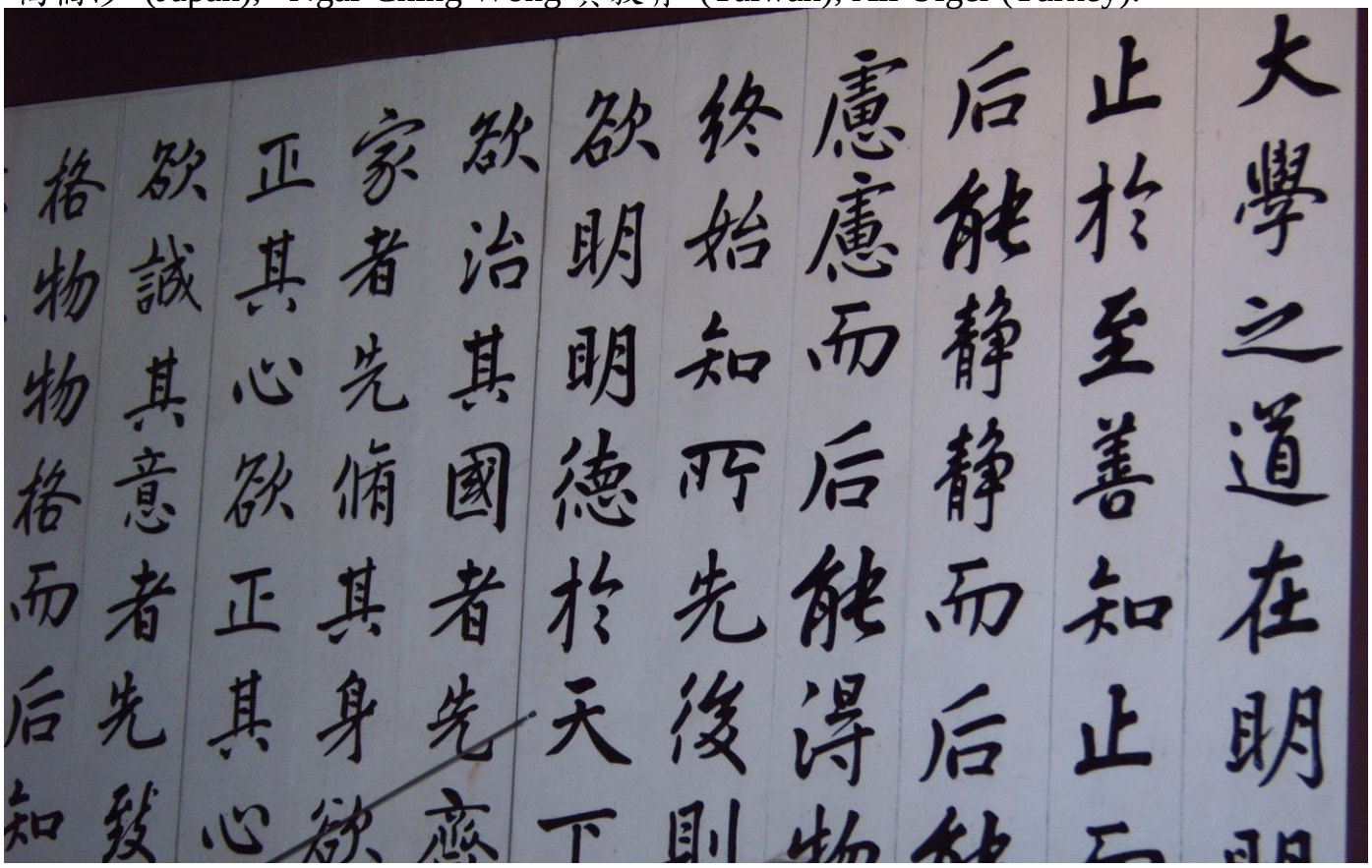

Speakers: J. Alaminos, A. Baklouti, C. Braun, Der-Chen Chang, Chang-Pao Chen, M. Filali, H. Fuehr, K. Furutani, Ed Granirer, Takashi Honda, M. Hoshino, Zhiguo Hu, C. Iwasaki, Ali Jabbari, S. Kahler, E. Kaniuth, Y. Kimura, D. Kuroiwa, Hang-Chin Lai, M. Lashkarizadeh Bami, Anthony T.-M. Lau, Ka-Sing Lau, Ming-Yi Lee, M. Leinert, Chi-Wai Leung, Chin-Cheng Lin, Lai-Jiu Lin, J. Ludwig, I. Markina, S.-Y. Matsushita, H. Miyake, Chi-Keung Ng, T. Ohwada, D. Poguntke, Zhong-Jin Ruan, K. Saito, B. Schreiber, B.-W. Schulze, T. Takahashi, T. Tanaka, T. Tanino, K. Taylor, A. Ulger, T. Umeda , A. Vasiliev, A. Villena, Ya-Shu Wang, Ngai-Ching Wong and Huoxiong Wu.

Sponsors: National Center for Theoretical Sciences, Taiwan National Science Council, and National Sun Yat-sen University.

http://www.math.nsysu.edu.tw/~wong/aha2009

Abstract Harmonic Analysis 2009
抽象調和分析研討會

11/F Library Building
National Sun Yat-sen University
Kaohsiung, Taiwan, R. O. C.
December 18–22, 2009.

December 22, 2009

Friday, December 18, 2009

08:10 – 08:40 Registration

Lecture Room A/B (Chair: Ngai-Ching Wong)

08:45 – 09:00 Opening
Hung-Duen Yang 楊弘敦校長 (President, National Sun Yat-sen University)
Anthony To-Ming Lau 劉道明教授 (President, Canadian Mathematical Society)

09:00 – 09:40 Chin-Cheng Lin 林欽誠 (National Central University, Taiwan) (page 15)
Local Hardy-Littlewood maximal operator.

09:50 – 10:30 Eberhard Kaniuth (University of Paderborn, Germany) (page 12)
Characterizing the image of the Gelfand transform of commutative Banach algebras and of their multiplier algebras.

tea/coffee/snacks

Lecture Room A/B (Chair: Eberhard Kaniuth)

10:50 – 11:30 Jeronimo Alaminos (University of Granada, Spain) (page 7)
Applying synthesis to the study of operators.

11:40 – 12:20 Chi-Keung Ng 吳志強 (Nankai University, China) (page 18)
Distance between discrete groups.

Lunch

Parallel Session I, Lecture Room A (Chair: Chi-Keung Ng)

13:20 – 14:00 Stefan Kahler (Munich University of Technology, Germany) (page 11)
Growth conditions for polynomial hypergroups and amenability.

Parallel Session II, Lecture Room B (Chair: Chin-Cheng Lin)

13:20 – 14:00 Shin-ya Matsushita (Akita Prefectural University, Japan) (page 17)
On matching theorems in Hilbert spaces.

14:10 – 14:50 Ya-Shu Wang 王雅書 (National Sun Yat-sen University, Taiwan) (page 28)
Disjointness structures of smooth Banach manifolds.

TEA/COFFEE/SNACKS

Parallel Session I, Lecture Room A (`Chair: Der-Chen Chang`)

15:10 – 15:50 Alexander Vasiliev (University of Bergen, Norway) (page 27)
Conserved quantities of contour evolution.

16:00 – 16:40 Irina Markina (Matematisk Institutt, Norway) (page 16)
The notion of the sub-Lorentzian geometry.

16:50 – 17:30 Ming-Yi Lee 李明億 (National Central University, Taiwan) (page 14)
A wavelet characterization for the dual of weighted Hardy spaces.

Parallel Session II, Lecture Room B (`Chair: Wataru Takahashi`)

15:10 – 15:50 Tetsuzo Tanino (Osaka University, Japan) (page 25)
Cost allocation in minimum cost spanning tree problems with groups.

16:00 – 16:40 Takashi Honda (National Sun Yat-Sen University, Taiwan) (page 10)
Nonlinear Retractions In Banach Spaces Which Concern Conditional Expectations And Applications.

16:50 – 17:30 Lai-Jiu Lin 林來居 (National Changhua Univ. of Ed., Taiwan) (page 16)
Existence theorems of relation problems with application to nonlinear problems.

Reception at the venue (17:30 – 19:15 pm)

Shanghai Opera at Dr. Sun Yat-sen Memorial Hall in campus (19:30 – 22:00 pm)

Saturday, December 19, 2009

Lecture Room A/B (`Chair: Anthony Lau`)

09:00 – 09:40 Wataru Takahashi 高橋涉 (National Sun Yat-sen University, Taiwan) (page 23)
Fixed point theorems and convergence theorems for nonlinear mappings in Banach spaces.

09:50 – 10:30 B.-Wolfgang Schulze (University of Potsdam, Germany) (page 22)
Pseudo-differential boundary value problems without the transmission property.

TEA/COFFEE/SNACKS

Lecture Room A/B (`Chair: Chi-Wai Leung`)

10:50 – 11:30 Ka-Sing Lau 劉家成 (Chinese University of Hong Kong, Hong Kong) (page 14)
The Laplacians and heat kernels on fractal sets.

11:40 – 12:20 Armando Villena (University of Granada, Spain) (page 27)
Hyperreflexivity of the derivation space of some group algebras.

Lunch

Parallel Session I, Lecture Room A (`Chair: Chang-Pao Chen`)

13:20 – 14:00 Hang-Chin Lai 賴漢卿 (Chung Yuan Christian University, Taiwan) (page 13)
Invariant operators and multipliers of Banach-valued function spaces.

14:10 – 14:50 KichiSuke Saito (Niigata University, Japan) (page 21)
Refinements of sharp triangle inequalities in Banach spaces and its applications.

Parallel Session II, Lecture Room B (`Chair: Tetsuzo Tanino`)

13:20 – 14:00 Tamaki Tanaka 田中環 (Niigata University, Japan) (page 24)
On nonlinear scalarizing functions for set-valued maps.

14:10 – 14:50 Hiromichi Miyake (Tokyo City University, Japan) (page 18)
Mean ergodic theorems for bounded vector-valued functions and their applications.

TEA/COFFEE/SNACKS

Parallel Session I, Lecture Room A (`Chair: Irina Markina`)

15:10 – 15:50 Kenro Furutani 古谷賢朗 (Tokyo University of Science, Japan)(page 9)
Generalized Atiyah-Patodi-Singer boundary conditions and variations of a spectral flow formula.

16:00 – 16:40 Chang-Pao Chen 陳璋泡 (Hsuan Chuang University, Taiwan) (page 8)
Operator norms and lower bounds of generalized Hausdorff matrices.

16:50 – 17:30 Huoxiong Wu 伍火熊 (Xiamen University, China) (page 28)
On the generalized Littlewood-Paley operators.

Parallel Session II, Lecture Room B (`Chair: Wataru Takahashi`)

15:10 – 15:50 Mitsuhiro Hoshino (Akita Prefectural University, Japan) (page 10)
On a state preserving property of non-positive inner product in self-organizing maps.

16:00 – 16:40 Daishi Kuroiwa (Shimane University, Japan) (page 13)
Set optimization and duality theorems.

16:50 – 17:30 Yutaka Kimura (Akita Prefectural University, Japan) (page 12)
Equilibrium points of a noncooperative fractional game with some methods.

Sunday, December 20, 2009

Lecture Room A/B (`Chair: B.-Wolfgang Schulze`)

09:00 – 09:40 Der-Chen Chang 張德健 (Georgetwon Universit, USA) (page 8)
Div-curl lemmas, local Hardy spaces and elliptic boundary value problems.

09:50 – 10:30 Carine Molitor-Braun (University of Luxembourg, Luxembourg) (page 7)
Actions of compact groups on nilpotent Lie groups.

TEA/COFFEE/SNACKS

Lecture Room A/B (`Chair: Ying-Fen Lin`)

10:50 – 11:30 Chi-Wai Leung 梁子威 (Chinese University of Hong Kong, Hong Kong) (page 15)
Orthogonal matrix coefficients on certain homogeneous spaces.

Lunch

Group Photo Time

A half day tour for local attractions

Granirer's Monday, December 21, 2009

Lecture Room A/B (`Chair: Ali Ulger`)

09:00 – 09:40 Anthony To-Ming Lau 劉道明 (University of Alberta, Canada) (page 13)
Fixed point property for Banach algebras associated to locally compact groups.

09:50 – 10:30 Keith Taylor (Dalhousie University, USA) (page 26)
Groups with Atomic Regular Representation.

TEA/COFFEE/SNACKS

Lecture Room A/B (`Chair: Detlev Poguntke`)

10:50 – 11:30 Micheal Leinert (Heidelberg University, Germany) (page 14)
Wiener's Theorem on Hypergroups.

11:40 – 12:20 Bertram Schreiber (Wayne State University, USA) (page 22)
K-Isotropic Completely Bounded Multilinear Forms, with Applications to Harmonizable Stochastic Processes.

Lunch

Lecture Room A/B (`Chair: Micheal Leinert`)

13:20 – 14:00 Detlev Poguntke (University of Bielefeld, Germany) (page 19)
Wiener theorems for $\mathcal{C}^p$-spaces on general motion groups.

14:10 – 14:50 Zhong-Jin Ruan 阮忠進 (University of Illinois at Urbana-Champaign, USA) (page 21)
p-Approximation Properties for Locally Compact Groups.

TEA/COFFEE/SNACKS

Lecture Room A/B (`Chair: Keith Taylor`)

15:10 – 15:50 Ali Ulger (Koc University, Turkey) (page 26)
An Abstract Form of a theorem of Helson and applications to sets of synthesis.

16:00 – 16:40 Zhiguo Hu (University of Windsor, Canada) (page 10)
Some Arens irregularity properties of Banach algebras.

16:50 – 17:30 Ed Granirer (University of British Columbia, Canada) (page 9)
Functional Analytic Properties of the Banach Algebras $A_p^r(G) = A_p \cap L^r(G)$.

Banquet at 7:00 pm, Kingship Hotel

Tuesday, December 22, 2009

Lecture Room A/B (`Chair: Ka-Sing Lau`)

09:00 – 09:40 Ngai-Ching Wong (National Sun Yat-sen University, Taiwan) (page 28)
Disjointness and orthogonality preserving linear maps of Fourier algebras.

09:50 – 10:30 Jean Ludwig (Universite Paul Verlaine-Metz, France) (page 16)
Dual topology of the motion groups $SO(n) \ltimes \mathbb{R}^n$.

TEA/COFFEE/SNACKS

Parallel Session I, Lecture Room A (`Chair: Zhong-Jin Ruan`)

10:50 – 11:30 Hartmut Fuehr (RWTH Aachen, Germany) (page 9)
Wavelet characterization of Besov spaces on stratified Lie groups.

11:40 – 12:20 Mahmoud Filali (Oulu University, Finland) (page 8)
On the size of the quotients of function spaces on a locally compact group.

Parallel Session II, Lecture Room B (`Chair: Alexander Vasiliev`)

10:50 – 11:30 Chisato Iwasaki 岩崎千里 (University of Hyogo, Japan) (page 11)
Symbolic calculus of pseudo-differential operators and a local index.

11:40 – 12:20 Tomio Umeda (University of Hyogo, Japan) (page 26)
The asymptotic limits of zero modes of massless Dirac operators.

Lunch

Parallel Session I, Lecture Room A (`Chair: Bertram Schreiber`)

13:20 – 14:00 Tomoyoshi Ohwada (Shizuoka University, Japan) (page 19)
On intermediate subalgebras of a crossed product, and its maximality.

14:10 – 14:50 Ali Baklouti (Faculty of Sciences of Sfax, Tunisia) (page 7)
On some monomial representations of exponential Lie groups.

Closing Remarks

Abstracts

Applying synthesis to the study of operators

Jeronimo Alaminos
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Abstract

We will show that the study of sets of synthesis and functions of synthesis can be applied to problems appearing in different settings like disjointness preserving operators or determination of operators using their spectral properties.

On some monomial representations of exponential Lie groups

Ali Baklouti
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Abstract

We discuss in this talk some problems related to a monomial representation $\tau = \mathrm{ind}_H^G \chi$ where G denotes an exponential solvable Lie group, H an analytic subgroup of G and χ a unitary character of H. We first record some results where G is nilpotent. Passing from nilpotent to exponential, many complications arise. The goal is to put the emphasis on a restrictive case where the multiplicities of τ are with discrete type. This is a joint work in progress with H. Fujiwara and J. Ludwig.

Actions of compact groups on nilpotent Lie groups

Catherine Molitor-Braun
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Abstract

Let $N = \exp \mathfrak{n}$ be a connected, simply connected, nilpotent Lie group. Let K be a compact subgroup of the automorphism group of N, acting smoothly on N. The purpose of this talk is to show progress made in the K-invariant ideal theory of the group algebra $L^1(N)$. This involves Fourier inversion type questions and the construction of smooth families of intertwining operators.
Joint work with Raza Lahiani and Jean Ludwig.

Div-curl lemmas, local Hardy spaces and elliptic boundary value problems

Der-Chen Chang

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Abstract

Let $\Omega \subset \mathbf{R}^n$ be a Lipschitz domain. In this talk, the speaker will discuss joint works with G. Dafni, E.M. Stein, S. Karntz, C. Sadosky and H. Yue. Mainly, we prove div-curl type lemma for the local spaces of functions of bounded mean oscillation on Ω, $bmo_r(\Omega)$ and $bmo_z(\Omega)$, resulting in decompositions for the local Hardy spaces $h^1_z(\Omega)$ and $h^1_r(\Omega)$ into non-homogeneous div-curl quantities. In particular, we may recover previous results on homogeneous div-curl type lemma.

Operator norms and lower bounds of generalized Hausdorff matrices

Chang-Pao Chen

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Abstract

Let $A = (a_{n,k})_{(n,k)>0}$ be a non-negative matrix. Denote by $L^{p,q}(A)$ the supremum of those L satisfying the following inequality:

$$\left(\sum_{n=0}^{\infty}\left(\sum_{k=0}^{\infty} a_{n,k}x_k\right)^q\right)^{1/q} \geq L\left(\sum_{k=0}^{\infty} {x_k}^p\right)^{1/p}, \quad (X \in \ell_p, X \geq 0).$$

The purpose of this paper is to establish a Bennett-type formula for $\|H^0_\mu\|^{\downarrow}_{p,p}$ and a Hardy-type formula for $L^{\downarrow}_{p,p}(H^\alpha_\mu)$ and $L_{p,p}(H^\alpha_\mu)$, where H^α_μ is a generalized Hausdorff matrix and $0 < p \leq 1$. Similar results are also established for $L_{p,q}(H^\alpha_\mu)$ and $L_{p,q}((H^\alpha_\mu)^t)$ for other ranges of p and q. Our results extend known results from H^0_μ to H^α_μ with $\alpha \geq 0$ and completely solve the value problem of $\|H^0_\mu\|^{\downarrow}_{p,p}$, $L^{\downarrow}_{p,p}(H^\alpha_\mu)$, $L_{p,p}(H^\alpha_\mu)$ and $L_{p,p}((H^\alpha_\mu)^t)$ for $\alpha \in \mathbb{N} \cup \{0\}$.

On the size of the quotients of function spaces on a locally compact group

Mahmoud Filali

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Abstract

For a locally compact group, the following quotient spaces are studied: $C_b(G)/C_{ru(G)}$, $C_{ru}(G)/C_u(G)$, $WAP_0(G)/C_0(G)$, $WAP(G)/\overline{B(G)}$, $WAP(G)/AP(G) \oplus C_0(G)$, $L^\infty(G)/WAP(G)$.
Some of the results are proved for general topological groups.

Wavelet characterization of Besov spaces on stratified Lie groups

Hartmut Fuehr
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Generalized Atiyah-Patodi-Singer boundary conditions and variations of a spectral flow formula

Kenro Furutani
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Abstract

I recall a selfadjoint extension problem of symmetric operator and introduce a symplectic Hilbert space by using Green formula. Then I will introduce Maslov index in the infinite dimension and spectral flow for a family of selfadjoint Fredholm operators in a functional analytic way. Then I will explain generalized Atiyah-Patodi-Singer boundary conditions which appears when we split a manifold into two part. Finally I show a formula of coincidence of the two quantities (Maslov index = Spectral flow).

Functional analytic properties of the Banach algebras $A_p^r(G) = A_p \cap L^r(G)$

Edmond Granirer
Department of Mathematics, University of British Columbia, Canada
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Abstract

Functional Analytic Properties, for the above algebras, such as, Arens regularity, amenability, weak sequential completeness, strict containment for fixed p and increasing r, nonfactorisation, the RNP, ..., etc. are investigated.

Nonlinear Retractions In Banach Spaces Which Concern Conditional Expectations And Applications

Takashi Honda

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Abstract

Recently, four nonlinear retractions (projections) were found in a Banach space. They are the metric projection, a sunny nonexpansive retraction, the generalized projection and a sunny generalized nonexpansive retraction. In a Hilbert space, they are equivalent to the metric projection. They can also related to the resolvents of accretive operators or monotone operators. Using these retractions, we can solve variational inequalities and fixed point problems in a Banach space. In this talk, we consider one of them, a sunny generalized nonexpansive retraction. It was found by Ibaraki and Takahashi few years ago. First, we found the relation between conditional expectations and sunny generalized nonexpansive retractions. Using this retraction, we extend the orthogonal complemented subspace decomposition in a Hilbert space to a Banach space. From this, we can deal with the relation between contractive linear projections and sunny generalized nonexpansive retractions. Further, we discuss an equivalent condition for a closed half space in a a Banach space to be a nonexpansive retract as the application of the orthogonal decomposition.

On a state preserving property of non-positive inner product in self-organizing maps

Mitsuhiro Hoshino

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Abstract

We deal with self-organizing map models referred to as Kohonen type algorithm. In self-organizing maps, it is easy to observe some practical and interesting properties in the relation between the arrangement of the nodes and their values. This speech is mainly concerned with behavior of ordering and state preserving properties in self-organizing maps with one-dimensional array of nodes and inputs taking values in an inner product space, and their stochastic estimation by simulation approach.

Some Arens irregularity properties of Banach algebras

Zhiguo Hu

Mathematics and Statistics, University of Windsor, Canada

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Abstract

Let A be a Banach algebra. It is known that the multiplication on A can be extended naturally to two Banach algebra multiplications on the bidual of A, called the left and right Arens products. The Banach algebra A is said to be Arens regular if the two Arens products coincide. In this talk, we shall discuss some Arens irregularity properties, including the extreme non-Arens regularity property introduced by Ed Granirer in 1996.

Symbolic calculus of pseudo-differential operators and a local index

Chisato Iwasaki

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Abstract

I will show that a local version of Gauss-Bonnet-Chern theorem on Riemannian manifolds with boundary and its generalization are obtained by symbolic calculus of pseudo-differential operators, if we introduce a new weight for symbols. A local version of Riemnann-Roch-Hirzebruch theorem on Kaehler manifolds is obtained by the similar methods.

Growth conditions for polynomial hypergroups and amenability

Stefan Alexander Kahler

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Abstract

We consider polynomial hypergroups on $\mathbb{N}_0$. As for locally compact groups, for such a hypergroup there exists a Haar measure, and the basic tools of harmonic analysis are available. The Haar measure is given by the counting measure on $\mathbb{N}_0$ weighted by a Haar function $w_{Haar} : \mathbb{N}_0 \to [0, \infty)$. In this talk we study various conditions on the growth of w_{Haar}, for example boundedness, polynomial growth and subexponential growth. We examine relations of these notions to another, more involved growth condition which appears i.a. in the context of amenability. Then we present applications to the theory of orthogonal polynomials and to amenability (and generalized concepts) of polynomial hypergroups. In particular we study connections between growth conditions and some necessary conditions for weak amenability of a polynomial hypergroup. As a special case we consider polynomial hypergroups constructed by a criterion of R. Szwarc, for which some of our results can be sharpened.

Characterizing the image of the Gelfand transform of commutative Banach algebras and of their multiplier algebras

Eberhard Kaniuth

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Abstract

Let A be a semisimple commutative Banach algebra with Gelfand spectrum $\Delta(A)$ and let $M(A)$ be the multiplier algebra of A. For $T \in M(A)$ and $a \in A$, respectively, let $\widehat{T}$ and $\widehat{a}$ denote the Gelfand transform of T and a on $\Delta(A)$, respectively. The talk will focus on giving an intrinsic characterization of the images $\widehat{A} = \{\widehat{a} : a \in A\}$ and $\widehat{M(A)} = \{\widehat{T} : T \in M(A)\}$ under the Gelfand homomorphism as certain continuous functions on $\Delta(A)$. Due to classical results, such characterizations are known for the L^1-algebra $L^1(G)$ of a locally compact abelian group G and for the measure algebra $M(G)$, which is isometrically isomorphic to the multiplier algebra of $L^1(G)$.
Establishing such results for other, more general classes of commutative Banach algebras has been a matter of interest for quite some time. Notably, a number of Japanese mathematicians have been working on the topic. The main purpose of the talk is to discuss very recent results that have been obtained in collaboration with Ali Ülger (Koc University, Istanbul).
Apart from giving some general results on how the validity of such characterization behaves under forming, e.g., unitizations and projective tensor products, the emphasis will be on

- Fourier algebras $A(G)$ and Fourier-Stieltjes algebras $B(G)$ of a locally compact group and ideals of these algebras, thus extending the results for $L^1(G)$ and $M(G)$ mentioned above;
- uniform algebras, that is, closed subalgebras of $C(X)$, the algebra of continuous functions on a compact Hausdorff space X, thus extending what is known for the disc algebra.

Equilibrium points of a noncooperative fractional game with some methods

Yutaka Kimura

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Abstract

We are interested in a noncooperative n person game with a fractional loss function for each player, which is called such a game a noncooperative n person fractional game. We consider existence of equilibrium points of the game using some properties of a parametric noncooperative n person fractional game.

So, in this talk, we investigate some methods for euilibrium points of a noncooperative n person fractional game and a parametric noncooperative n person fractional game. Moreover, we define an ε-equilibrium point of a fractional game and show their existence.

Set optimization and duality theorems

Daishi Kuroiwa

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Abstract

We study an optimization problem which is called a set optimization problem. We investigate the dual space of an ordered vector space in which the set optimization problem is embedded, and characterize the dual problem.

Invariant operators and multipliers of Banach-valued function spaces

Hang-Chin Lai

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Abstract

The purpose of this paper is to characterize various spaces of invariant operators from a Banach valued function space into another Banach-valued function space. We also establish a relationship between invariant operators and multiplier operators. Finally, we extend these results to the multiplier space of the vector-valued Bochner integrable function space.
Keywords and phrases: Banach A-module, invariant operator, multiplier of Banach algebra, Bochner integral, vector measure, Radon Nikodym property.

Fixed point property for Banach algebras associated to locally compact groups

Anthony To-Ming Lau

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Abstract

This talk is based on my recent joint work with Peter F. Mah dedicated to our teacher, Professor Edmond E. Granirer on the occasion of his 75th birthday.
In this talk, I will discuss various Banach algebras associated to a locally compact group with the weak or weak*-fixed point property for non-expansive mappings.

The Laplacians and heat kernels on fractal sets

Ka-Sing Lau
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Abstract

The Laplcian plays a central role in analysis and PDE. Recently there is a surge of interest to study this operator and diffusion of fractal sets. One of the questions is to define a Laplacian without using derivative. In this talk, we will give a brief survey on this and to report some of our work in connection with the heat kernels that arise.

A wavelet characterization for the dual of weighted Hardy spaces

Ming-Yi Lee
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Abstract

We define the weighted Carleson measure space CMO_w^p by wavelet, where the weight function w belongs to the Muckenhoupt class. Then we show that CMO_w^p is the dual space of the weighted Hardy space H_w^p by using sequence spaces.
As an application, we give a wavelet characterization of BMO_w.

Wiener's Theorem on Hypergroups

Michael Leinert
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Abstract

This is a joint work with W.Bloom and J.Foumier.
The following theorem is due to Norber Wiener: If an integrable function f on the circle group T has non-negative Fourier coefficients and is square integrable on a neighbourhood of the identity, then f is square integrable on all of T. This result has been extended to even exponents, but shown to fail for all other exponents $p > 1$ (S. Wainger, H. S. Shapiro). All of this was extended to compact abelian groups (M. Rains), then (in appropriate reformulation) to locally compact abelian groups, and finally to groups with at least one invariant neighbourhood (IN-groups) (M. Leinert). We now prove Wiener's theorem with even exponents for a large class of commutative hypergroups. In addition, we present examples of commutative hypergroups for which, in sharp contrast to the group case, Wiener's theorem holds for all exponents $p > 1$.
We also characterise locally integrable functions of positive type as well as their Fourier transforms in terms of amalgam spaces, thus extending a theorem by J. Foumier on locally compact abelian groups.

Orthogonal matrix coefficients on certain homogeneous spaces

Chi-Wai Leung
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Abstract

Let G be a locally compact group and let K be its closed subgroup. We call a pair (G, K) admissible if for each irreducible representation (π, V_π) of G, its K-invariant subspace V_π^K is of finite dimension. Write $\widehat{G}_K$ for the set of irreducible representations with non-zero K-invariant vectors. For each π in $\widehat{G}_K$, let $\pi_{v_i,\bar{\xi}_j}$'s ($\pi_{v_i,\bar{\xi}_j}(gK) := \langle v_i, \pi(g)\xi_j\rangle$), be the matrix coordinate functions on G/K induced by fixed orthonormal bases $\{v_i\}$ and $\{\xi_j\}$ for V_π and V_π^K respectively.
Let μ be a probability measure on G/K. We call μ a spectral measure if there is a subset Γ of $\widehat{G}_K$ such that the set of all such matrix coordinate functions $\pi_{v_i,\bar{\xi}_j}$, $\pi \in \Gamma$, constitute an orthonormal base for $L^2(G/K, \mu)$ with some suitable normalization of these matrix coordinate functions.
In this talk, we shall present some results of spectral measures for certain admissible pairs.

Local Hardy-Littlewood maximal operator

Chin-Cheng Lin
Department of Mathematics, National Central University, Taiwan
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Abstract

In this talk we define and investigate a local Hardy-Littlewood maximal operator in Euclidean spaces. It is proved that this operator satisfies weighted L^p, $p > 1$, and weighted weak type $(1, 1)$ estimates with weight function $w \in A^p_{\text{loc}}$, the class of local A_p weights which is larger than the

Muckenhoupt A_p class. Also, the condition $w \in A^p_{\text{loc}}$ turns out to be necessary for the weighted weak type (p,p), $p \geq 1$, inequality to hold.

Existence theorems of relation problems with application to nonlinear problems

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Abstract

In this paper, we study existence theorem of a relation problem. From this existence theorem of relation problem, we establish some existence theorems of variational relation problems, nonlinear inclusion problems, variational inclusion problems and equilibrium problems. Our problem contain many problems as special cases. Our results are different any existence results of these types of problems in the literatures.

Dual topology of the motion groups

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Abstract

Let $n \in \mathbb{N}^*$ and let $M_n = SO(n) \ltimes \mathbb{R}^n$ be the corresponding motion group. We describe in this talk the topology of the dual space $\hat{M}_n$ and identifying $\hat{M}_n$ with the subspace of admissible coadjoint orbits $m_n^{\ddagger}/M_n$, we show that this identification is a homeomorphism.

The notion of the sub-Lorentzian geometry

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Abstract

Sub-Riemannian manifolds and the geometry introduced by bracket generating distributions of smoothly varying k-plains is widely studied, interesting subject, which has applications in control theory, quantum physics, C-R geometry, and other areas. The main difference of the sub-Riemannian manifold from a Riemannian one is the presence of a smooth subbundle of the tangent bundle, generating the entire tangent bundle by means of the commutators of vector fields. The subbundle, which is often called horizontal, is equipped with a positively definite metric that leads

to the triple: manifold, horizontal subbundle, and Riemannian metric on the horizontal subbundle, which is called a sub-Riemannian manifold. The foundation of the sub-Riemannian geometry can be found in [4, 5]. The following question can be asked. What kind of geometrical features will have the mentioned triplet if we change the positively definite metric to an indefinite non-degenerate metric. It is natural to start with the Lorentzian metric of index 1. In this case the triplet: manifold, horizontal subbundle, and Lorentzian metric on the horizontal subbundle can be called sub-Lorentzian manifold. It was mentioned in [5] that it would be interesting to consider the sub- Lorentzian geometry, but there are only few works devoted to this subject. In the talk we present the different examples of the manifolds with the non-degenerated indefinite metric defined on the subbundle. We will compare the sub-Riemannian geometry and the sub-Lorentzian. We find the parametric equations for timelike future directed geodesics. We also present some physical applications. References

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On matching theorems in Hilbert spaces

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Abstract

Let X be a compact convex subset of a Hilbert space H, let $\{A_i : i = 1, 2, \ldots, n\}$ be a family of closed subsets of H such that $X = \cup_{i=1}^{n} A_i$ and let $\{C_i : i = 1, 2, \ldots, n\}$ be a family of nonempty compact subsets of H. Let $s : X \to H$ be a continuous mapping. In this talk we study a matching theorem concering closed convering of convex sets in Hilbert spaces. We present a condition which gurantee the existence $I \subset \{1, 2, \ldots, n\}$ and $\hat{x} \in X$ such that $\hat{x}$ is in the convex hull of $\cup\{C_i + s(\hat{x}) : i \in I\}$ and well as in $\cap\{A_i : i \in I\}$.

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Mean ergodic theorems for bounded vector-valued functions and their applications

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Abstract

Recently, we introduce notions of (weak) almost periodicity (in the sense of Eberlein) and almost convergence in the sense of Lorentz for bounded vector-valued functions defined on a semigroup which take values in a Banach space, and also study the relationship between the mean values and almost periodicity (or almost convergence) for those functions.
In this talk, it is shown that the results of our study can be applied to obtain mean ergodic theorems for linear and nonlinear semigroups of various types in Banach spaces.

Distance between discrete groups

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Abstract

We introduce and study briefly a notion of distance between two discrete groups.

On intermediate subalgebras of a crossed product, and its maximality

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Abstract

The maximality of subalgebras in a von Neumann algebra is one of the interesting problems and have been treated by many authors. In this talk we shall present correspondence between intermediate subalgebras of a crossed product and semigroups and, as an application of it, we will discuss the maximality of subalgebras.

Wiener theorems for $\mathcal{C}^p$-spaces on general motion groups

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Abstract

The classical Wiener approximation theorem tells that the translates of $f \in L^1(\mathbb{R})$ are total in $L^1(\mathbb{R})$ provided that f has a nowhere vanishing Fourier transform. Beurling (and his school) proved some results in this direction for functions $f \in L^p(\mathbb{R})$ with $p \neq 1$. Besides generalizations to general locally compact abelian groups there are also non-commutative versions. A locally compact group G is said to have the two-sided Wiener property if each proper closed two-sided translation invariant subspace of $L^1(\mathbb{G})$, i.e., two-sided closed ideal, is contained in the kernel of an (irreducible) involutive representation. Not each group has this property, but there are classes of groups, for which this property can be verified: various groups with polynomially growing Haar measure (R. Gangolli, H. Leptin, V. Losert, J. Ludwig), but also so-called contracting extensions (P. Müller-Römer) including some exponential Lie groups. Y. Weit studied also a one-sided version in the case of the motion group G of the real plane. He found a negative result: There exists a proper closed right ideal in $L^1(\mathbb{G})$ which is not contained in any closed maximal right ideal.

The present investigations have their origin in two more recent articles. R. Rawat and A. Sitaram (Israel J. Math. 91 [1995]) considered a subset X of $L^1 \cap L^p(\mathbb{R}^n)$ and asked for conditions which guarantee that $\langle X \rangle_{M(n)}$, the space of functions on $\mathbb{R}^n$ obtained from X by applying the members of the motion group $M(n) = SO(n) \ltimes \mathbb{R}^n$, is total in $L^p(\mathbb{R}^n)$. They found results for all p, $1 \leq p < 1$ (depending on p), for instance, $\langle X \rangle_{M(n)}$ is total in $L^p(\mathbb{R}^n)$ if $\frac{2n}{n-1} < p < \infty$ and $S(X) := \bigcap_{f \in X} \{r > 0 \mid \widehat{f} \equiv 0$ on the sphere in $\mathbb{R}^n$ of radius $r\}$ is nowhere dense in $\mathbb{R}_+$.

E. K. Narayanan and R. Rawat (to appear in Math. Z.) considered the motion group $M(2)$ of the real plane, a function $f \in L^1 \cap L^p(M(2))$, and they asked for (representation theoretic) conditions on f to guarantee that the set of right (or two-sided) translates of f is total in $L^p(\mathbb{R}^n)$. As above, they found results for all p, $1 \leq p < \infty$. The desired property is satisfied if the range of $\pi(f)$ is dense for sufficiently many irreducible representations π of $M(2)$. What 'sufficiently many' is, depends on p; typically, the larger p is, the weaker is the condition.

In this talk, I wish to report on generalizations of the above indicated results to groups of the form

$$G = K \ltimes M,$$

where K is compact, M is locally compact abelian; both are assumed to be second countable. One may think of K being a compact Lie group acting irreducibly on $\mathbb{R}^n$, for instance $K = SO(3)$ and $M = \{A \in M_{3,3}(\mathbb{R}) \mid A^T = A, \operatorname{Tr} A = 0\}$ with the obvious action.
The irreducible representations of G are very well understood. Let $\xi \in \widehat{M}$ = Pontryagin dual, and let $H = K_\xi$ be the stabilizer of ξ in K. With any irreducible representation σ of H one can associate (by inducing) an irreducible representation $\pi_{\xi,\sigma}$ of G.
These representations exhaust the unitary dual $\widehat{G}$; two representations $\pi_{\xi,\sigma}$ and $\pi_{\xi',\sigma'}$, are equivalent if and only if the pairs (ξ, σ) and (ξ', σ') are K-conjugate.
As one may imagine from the discussion of the "Indian articles" there is a variety of possible results: varying p, considering one-sided or two-sided invariant subspaces. In this abstract I shall restrict myself to two cases.
Theorem 1. Let X be a subset of $L^1 \cap L^p(G)$. If $\infty > p > 1$ assume that for all $\xi \in \widehat{M}$, $\xi \neq 0$, and for all $\sigma \in K_\xi^\wedge$ the operators $\pi_{\xi,\sigma}(f)$, $f \in X$, are "collectively dense", that is, if $\omega \in \mathfrak{H}_{\xi,\sigma}$ satisfies $\langle \pi_{\xi,\sigma}(f)\mathfrak{H}_{\xi,\sigma}, \omega\rangle = 0$ (for all f), then $\omega = 0$. If $p = 1$ assume this property for all ξ. Then the set of all functions obtained from X by K-left and G-right translations is total in $L^p(G)$.
The proof of this theorem rests on Banach algebra techniques. This theorem holds true for all p, but it gives a relevant result only for small p. The second case concerns "very large p", where one has much stronger results. Here one applies restriction theorems (of the Fourier transform). Consider first the following simplified situation. Suppose there is given a K-orbit S in $\widehat{M}$; it carries a canonical K-invariant measure μ_S. The Fourier transform $\mathcal{F}$ (for M) defines, by restriction, a map

$$C_c(M) \to^F C_\infty(\widehat{M}) \to L^2(S, d\mu_S).$$

Now it may happen that for some exponent, say r, this map extends to a bounded operator

$$L^r(M) \to L^2(S, d\mu_S).$$

The 'classical case' is $M = \mathbb{R}^n$, $S = S^{n-1}$; here one has this boundedness if $r = \frac{2n+2}{n+3}$ (or smaller).
More generally, suppose that there is a subset Ω of $\widehat{M}$, which is open, K-invariant and of full measure, with the following properties. There is a covering $\Omega = \bigcup_{j\in J} \Omega_j$, J being at most countable, each Ω_j is open and K-invariant and there are 'trivializations'

$$\gamma_j : K/H_j \times U_j \to \Omega_j,$$

i.e., K-homeomorphisms, where the U_j are locally compact spaces with trivial K-action (this is so far not a serious restriction). Further assume that there is an exponent $r > 1$ such that one obtains, by restricting the Fourier transform to K-orbits in Ω_j and transforming along γ_j, a bounded operator

$$L^r(M) \ni f \mapsto R_{\mathfrak{p}}^{(j)} f \in L^2(K/H_j)$$

for $\mathfrak{p} \in U_j$. Assume finally that $U_j \ni \mathfrak{p} \mapsto \|R_{\mathfrak{p}}^{(j)}\|$ is locally bounded.
Theorem 2. Under the above described properties and notation let X, for $1 < p < \infty$, be a subset of $L^1 \cap L^p(G)$ such that p' (= conjugate exponent) is smaller than r. Assume further that there is a dense subset Γ of Ω such that for all $\xi \in \Gamma$ and all $\xi \in K_\xi^\wedge$ the collection of operators $\pi_{\xi,\sigma}(f)$,

$f \in X$, is collectively dense in $\mathfrak{H}_{\xi,\sigma}$. Then $\langle X \rangle_G$, the set of functions obtained from X by applying G-right-translations, is total in ${}^p(G)$.
The assumptions of Theorem 2 can be veri ed, for instance, if $M = \mathbb{R}^n$, and K acts irreducibly on $\mathbb{R}^n$, using the methods described in Stein's book on Harmonic Analysis: Real-Variable Methods, Orthogonality and Oscillatory Integrals. But, as far as I can see, it is difficult to find an optimal r (i.e., as large as possible; up to my best knowledge even in the above mentioned example of $SO(3)$ acting on a space of 3×3 matrices an optimal r is not known.). This might be a task for further research. Also, I must admit that I don't know if there are other relevant cases, besides $M = \mathbb{R}^n$, where Theorem 2 might be applicable.
Finally, results on G-invariant subspaces of $L^p(M)$ can be deduced from the corresponding results on subspaces of $L^p(G)$ because with subspaces of $L^p(M)$ one can associate subspaces of $L^p(G)$. In particular, the results of Rawat/Sitaram can be deduced from ours.

p-Approximation Properties for Locally Compact Groups

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Abstract

In this talk, I will first review some well-known approximation properties for group C*-algebras and group von Neumann algebras.
I will then discuss the corresponding approximation properties for the pseudofunction algebras $FP_p(G)$ and the pseudomeasure algebras $PM_p(G)$. The theory of p-Operator spaces provides an important tool for this study.

Refinements of sharp triangle inequalities in Banach spaces and its applications

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Abstract

The triangle inequality is one of the most important tools in analysis. In recent year, refinements of triangle inequality in Banach spaces were presented by several papers. Recently, Mitani, Saito, Kato and Tamura showed the following inequalities.

Theorem A. For all nonzero elements $x_1, x_2, \ldots, x_n$ in a Banach space X, $n > 2$,

$$\begin{aligned}
&\|\sum_{j=1}^{n} x_j\| + \sum_{k=2}^{n}\left(k - \|\sum_{j=1}^{k}\frac{x_j^*}{\|x_j^*\|}\right)(\|x_k^*\| - \|x_{k+1}^*\|) \\
&\leq \sum_{j=1}^{m}\|x_j\| \\
&\leq \|\sum_{j=1}^{n} x_j\| - \sum_{2}^{n}\left(k - \|\sum_{j=n-(k-1)}^{n}\frac{x_j^*}{\|x_j^*\|}\right)(\|x_{n-k}^*\| - \|x_{n-(k-1)}^*\|),
\end{aligned}$$

where $x_1^*, x_2^*, \ldots, x_n^*$ are the rearrangement of $x_1, x_2, \ldots, x_n$ satisfying $\|x_1^*\| \geq \|x_2^*\| \geq \cdots \geq \|x_n^*\|$, and $x_0^* = x_{n+1}^* = 0$.
In this talk we present the recent works of sharp triangle inequalities and consider the applications.

K-Isotropic Completely Bounded Multilinear Forms, with Applications to Harmonizable Stochastic Processes

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Abstract

Let K be a compact group acting as a transformation group via automorphisms on the locally compact group G. Then K acts in the canonical way on unitary representations of G, and thus on both $C^*(G)$ and its dual, $B(G)$. More generally, if we let K act diagonally on $G \times \cdots \times G$, then this induces an action of K on the Haagerup tensor product $C^*(G) \otimes_h \cdots \otimes_h C^*(G)$ and its dual space. A functional u in this dual space is called K-*isotropic* if $u^\kappa = u \ \forall \ \kappa \in K$, where u^κ denotes the image of u under the action of κ. When u is completely positive, a representation of the Fourier transform of u, as a function on $G \times \cdots \times G$, can be formulated in terms of K-spherical functions on G. When $K = SO(d)$ and K acts on $\mathbb{R}^d \times \mathbb{R}^d$, this leads to a representation theorem for isotropic, weakly harmonizable processes.

Pseudo-differential Boundary Value Problems without the Transmission Property

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Abstract

Boundary value problems for pseudo-differential operators appear when we reduce mixed problems (e.g., for the Laplacian with jumping Dirichlet-to-Neumann conditions along a smooth or singular interface) to the boundary. The resulting operators fail to have the transmission property at the interface, and regularity and asymptotics of solutions may be understood by interpreting the problems as edge problems with the interface as the edge. The edge calculus comes from the analysis on manifolds with singularities, and the respective techniques give a completely new insight into the nature of such boundary value problems. In particular, we encounter specific types of weighted Sobolev spaces, based on actions of one-parameter groups transversal to the interface, and we obtain parametrices within the edge calculus which explain regularity and asymptotic phenomena in a new natural way.

Fixed Point Theorems and Convergence Theorems for Nonlinear Mappings in Banach Spaces

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Abstract

Let H be a real Hilbert space and let C be a nonempty closed convex subset of H. Then, a mapping $T : C \to C$ is said to be firmly nonexpansive if

$$\|Tx - Ty\|^2 \leq \langle x - y, Tx - Ty\rangle$$

for all $x, y \in C$. Such a nonlinear mapping is deduced from an equilibrium problem in a Hilbert space as follows: Let C be a nonempty closed convex subset of H and let a bifunction $f : C \times C \to \mathbb{R}$ satisfy the following conditions:

(A1) $f(x, x) = 0, \quad \forall x \in C$;

(A2) f is monotone, i.e., $f(x, y) + f(y, x) \leq 0, \quad \forall x, y \in C$;

(A3) $\lim_{t\downarrow 0} f(tz + (1 - t)x, y) \leq f(x, y), \quad \forall x, y, z \in C$;

(A4) for each $x \in C$, $y \mapsto f(x, y)$ is convex and lower semicontinuous.

¿From the equilibrium problem, we know the following result:
Let C be a nonempty closed convex subset of H and let f be a bifunction from $C \times C$ into $\mathbb{R}$ satisfying (A1), (A2), (A3) and (A4). Then, for any $r > 0$ and $x \in H$, there exists $z \in C$ such that

$$f(z, y) + \frac{1}{r}\langle y - z, z - x\rangle \geq 0, \quad \forall y \in C.$$

Further, if $T_r x = \{z \in C : f(z, y) + \frac{1}{r}\langle y - z, z - x\rangle \geq 0,\ \forall y \in C\}$ for all $x \in H$, then the following hold:

(1) T_r is single-valued;

(2) T_r is firmly nonexpansive, i.e.,

$$\|T_r x - T_r y\|^2 \leq \langle T_r x - T_r y, x - y \rangle, \quad \forall x, y \in H.$$

A mapping $T : C \to C$ is said to be nonexpansive if $\|Tx - Ty\| \leq \|x - y\|$ for all $x, y \in C$. A mapping $S : C \to C$ is said to be nonspreading if

$$2\|Sx - Sy\|^2 \leq \|Sx - y\|^2 + \|x - Sy\|^2$$

for all $x, y \in C$. These two mappings are deduced from a firmly nonexpansive mapping in a Hilbert space. We know many fixed poin theorems and convergence theorems for nonexpansive mappings in a Hilbert space or a Banach space.
In this talk, we first consider nonlinear mappings which are deduced from a firmly nonexpansive mapping in a Hilbert space or a Banach space. Further, we deal with fixed point theorems and convergence theorems for the nonlinear mappings in a Hilbert space or a Banach space.

On nonlinear scalarizing functions for set-valued maps

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Abstract

Authors: Tamaki Tanaka, Yuuya Sonda, Issei Kuwano
We introduce a certain mathematical methodology on the comparison between sets in an ordered vector space. In set-valued optimization, there are some studies using the comparison between a vector and a set, and another studies using the comparison between sets as images of set-valued map. In [S-T-Y], we introduced unified types (1) and (2) below of scalarizing functions for set-valued maps, and in [K-T-Y] we provided some properties of them including the monotonicity and the inheritance on cone-convexity of parent set-valued maps. The aim of this talk is to report such properties and another inherited property with respect to semicontinuity of parent set-valued maps.
If a real-valued or vector-valued function has some kinds of convexity and continuity, then we can utilize such properties as a means to solve several types of equilibrium problems including variational inequalities, minimax problems, complementarity problems and other optimization problems. In vector-valued case, we apply corresponding real-valued results via scalarization as long as we find suitable monotone scalarizing functions for objective vector-valued functions. However it is unclear whether any scalarizing function for set-valued maps plays such a similar role. Hence, it is important that we verify its monotonicity and inherited properties on cone-convexity and semicontinuity of set-valued maps through scalarization.
Let X be a real topological vector space, Y a real ordered topological vector space with the vector ordering $\leq_C$ induced by a nonempty convex cone $C \subset Y$ (that is, for any $y, z \in Y$, $y \leq_C z$ if $z - y \in C$), $k \in \mathrm{int}C$, $V' \in 2^Y \setminus \{\emptyset\}$ and F a set-valued map from X into $2^Y \setminus \{\emptyset\}$. Then, for any $x \in X$ and for each $j = 1, \ldots, 6$, the following two types of sclarizing functions can be applied for the scalarization of set-valued map F ([K-T-Y]):

$$(1) \qquad (I^{(j)}_{k,V'} \circ F)(x) := I^{(j)}_{k,V'}(F(x)) := \inf \left\{ t \in \mathbb{R} \;\middle|\; F(x) \leq^{(j)}_C (tk + V') \right\},$$

$$(2) \qquad (S^{(j)}_{k,V'} \circ F)(x) := S^{(j)}_{k,V'}(F(x)) := \sup\left\{ t \in \mathbb{R} \;\middle|\; (tk + V') \leq^{(j)}_C F(x) \right\},$$

where the set-relationships $\leq^{(j)}_C$ $(j = 1, \ldots, 6)$ are defined in [K-T-H].

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Cost Allocation in Minimum Cost Spanning Tree Problems with Groups

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Abstract

Minimum cost spanning tree problems are fundamental optimization problems. A minimum cost spanning tree problem involves a set of agents is involved willing to be connected as cheap as possible to a source (i.e. a supplier of a service). It gives rise to two problems: the construction of a network of minimal cost (minimum cost spanning tree, mcst for short) connecting all agents to the source, and a cost sharing problem of distributing this cost in a fair way among agents. To construct an mcst, some efficient algorithms, such as the Prim algorithm and the Kruskal algorithm, have been proposed.

On the other hand, several interesting cost allocation rules, which are maps assigning to every minimum cost spanning tree situation a unique cost allocation, have been developed based on the obtained mcst. Corresponding to a minimum cost spanning tree problem, some cooperative games can be introduced and solutions of those games are closely related to the cost allocation rules.

Recently Bergant iños and Gómez-Rú proposed minimum cost spanning tree problems with groups which reflect structures among agents such as different villages, cities, etc. They also provided a two phase cost allocation rule based on the equal remaining obligation rule. In this paper we extend their approach and discuss some cost allocation rules in minimum cost spanning tree problems with groups with some theoretical results.

Groups with Atomic Regular Representation

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Abstract

A locally compact group is said to have atomic regular representation if its left regular representation is the direct sum of irreducible representations. All compact groups have this property, but it is rare for non-compact groups. Nevertheless, there are many natural situations in which they arise with implications for a wide range of theories from the properties of the Fourier algebra to wavelet analysis. This talk will provide an overview of this property and provide some applications.

An Abstract Form of a theorem of Helson and applications to sets of synthesis

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Abstract

Let G be a locally compact abelian group and $\widehat{G}$ its dual group. For each closed subset E of $\widehat{G}$, let $\phi_E : L^1(G) \to C_0(E)$, $\phi_E(a) = \widehat{a}|_E$, be the restriction of the Fourier transform to the set E. This is a Banach algebra homomorphism and its kernel is the ideal $k(E) = \{a \in L^1(G) : \widehat{a} = 0 \text{ on } E\}$. A closed subset E of $\widehat{G}$ is said to be an Helson set if the homomorphism ϕ_E is surjective. In this case the algebras $L^1(G)/k(E)$ and $C_0(E)$ are isomorphic so that the spaces $k(E)^\perp$ (the annihilator of the ideal $k(E)$ in $L^1(G)$) and $M(E) = C_0(E)^*$ are also isomorphic. The following theorem in the case $G = \mathbb{R}$ is due to Helson (Studia Math. 14 (1954), 209-213) and in the general case to Rudin (Fourier Analysis on Groups, Theorem 5.6.7).

Theorem (Helson/Rudin). Let $E, E \subseteq \widehat{G}$ be a closed Helson set. Then for a measure $\mu \in M(E)$ concentrated on E, $\widehat{\mu}$ belongs to $C_0(G)$ only if $\mu = 0$. (i.e. $k(E)^\perp \cap C_0(E) = \{0\}$).

In this talk we present an abstract and fairly general version of this intriguing theorem and some applications of it to the study of sets of synthesis. The abstract version of this theorem that we present applies (under quite mild hypotheses) to the classical Banach algebras of Harmonic Analysis such as $L^1(G)$, $A(G)$, $A_p(G)$, $L^1(G;\omega)$, $L^1(\mathbb{R}_+)$, ..., etc., and produces considerably stronger results than the conclusion of this theorem of Helson.

The asymptotic limits of zero modes of massless Dirac operators

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Abstract

The question whether a zero mode of a Weyl-Dirac operator exists or not was revealed to be very important in the study of stability of Coulomb systems with magnetic fields (Froehlich, Lieb and Loss 1986), and the first examples of zero modes of Weyl-Dirac operators were constructed by Loss and Yau in 1986. Since then, a lot of contributions to the study of the zero modes of the Weyl-Dirac operators have been made. On the other hand, it seems that properties of the zero modes themselves are not well understood. In this talk, I first make a quick review of the history of the study of zero modes of the Weyl-Dirac operators, and then talk about the asymptotic property of zero modes of massless Dirac operators which are generalizations of the Weyl-Dirac operators. One of our main results asserts that all zero modes behave in the same manner at infinity. (This talk is based on joint works with Yoshimi Saito.)

Conserved quantities of contour evolution

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Abstract

We consider planar contour evlution given by the Laplacian growth and by Loewner equation. The first one is a sample dissipative field problem, and the second is an infinite-dimensional controllable problem. For both problems we reveal an algebraic skeleton of conservation laws. These problems have strong connections to classical results in complex analysis.

Hyperreflexivity of the derivation space of some group algebras

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Abstract

Let T be a continuous linear operator on a Banach algebra A. We address the question of whether the constant $\sup\{\|aT(b)c\|\colon\ a,b,c \in A,\ ab = bc = 0,\ \|a\| = \|b\| = \|c\| = 1\}$ being small implies that the distance from T to the space $\mathtt{Der}(A)$ of all continuous derivations on A is small. We show that this is the case for amenable group algebras. As a consequence, we deduce that $\mathtt{Der}(L^1(G))$ is hyperreflexive for each amenable group in [SIN].

Disjointness structures of smooth Banach manifolds

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Abstract

Let X and Y be separating smooth Banach manifolds, and $S_1(X)$ and $S_2(Y)$ be abstract definition of a smoothness class S which generalizes the standard classes C^n. In this talk, we will show that for each continuous linear bijective separating map $T : S_1(X) \to S_2(Y)$, there exists a homeomorphism $\varphi : Y \to X$ and $h \in S_2(Y)$ such that $Tf(y) = h(y)f(\varphi(y))$ for all $y \in Y$ and $f \in S_1(X)$.

Disjointness and orthogonality preserving linear maps of Fourier algebras

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Abstract

We show that a linear bijection $\psi : A(G_1) \to A(G_2)$ between two Fourier algebras of locally compact (not necessarily abelian or amenable) groups will induce a topological group isomorphism between G_1 and G_2, provided that ψ preserves both disjointness and orthogonality. We also study the structure of bounded and unbounded disjointness preserving linear functionals of Fourier algebras, and their applications in characterizing the extremely left amenability of a semitopological semigroup S. In the development, general results about disjointness and orthogonality preserving linear maps between C*-algebras, W*-algebras and their preduals are obtained.

On the generalized Littlewood-Paley operators

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Abstract

In this talk, I will show some recent results on the generalized Littlewood-Paley operators, which contain the generalized Littlewood-Paley g-functions, Lusin area integrals and g_λ^*-functions, and the corresponding Marcinkiewicz integrals with rough kernels.

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Abstract Harmonic Analysis 2009 抽象調和分析研討會 2009

	Friday Dec. 18		Saturday Dec. 19		Sunday Dec. 20	Monday Dec. 21	Tuesday Dec. 22	
9:00-9:40am	Chin-Cheng Lin		Wataru Takahashi		Der-Chen Chang	Anthony Lau	Ngai-Ching Wong	
9:50-10:30	Eberhard Kaniuth		B.-Wolfgang Schulze		Carine Braun	Keith Taylor	Jean Ludwig	
	Tea/coffee/snacks							
10:50-11:30	Jeronimo Alaminos		Ka-Sing Lau		Chi-Wai Leung	Micheal Leinert	Hartmut Fuehr	Chisato Iwasaki
11:40-12:20	Chi-Keung Ng		Armando Villena		Lunch 12:30pm: Photo	Bert Schrieber	Mahmoud Filali	Tomio Umeda
	Lunch				1:00pm: A half day tour to look around Kaohsiung	Lunch		
1:20-2:00pm	Stefan Kahler	**Shin-ya Matsushita**	**Hang-Chin Lai**	Tamaki Tanaka		Detlev Poguntke	Tomoyoshi Ohwada	
2:10-2:50		Ya-Shu Wang	KichiSuke Saito	Hiromichi Miyake		Zhong-Jin Ruan	Ali Baklouti	
	Tea/coffee/snacks					Tea/coffee/snacks		
3:10-3:50	Alexander Vasiliev	**Tetsuzo Tanino**	Kenro Furutani	Mitsuhiro Hoshino		Ali Ulger		
4:00-4:40	Irina Markina	Takashi Honda	Chang-Pao Chen	Daishi Kuroiwa		Zhiguo Hu		
4:50-5:30	Ming-Yi Lee	**Lai-Jiu Lin**	Huoxiong Wu	Yutaka Kimura		Ed Granirer		

1. Venue: 11/F Library Building, NSYSU, Kaohsiung, Taiwan.
2. Registration takes place during 8:10-8:40 am, and Opening is at 8:45-9:00 am, Friday, Dec. 18. Taking a **group photo** at 12:30pm, Dec.20.
3. Reception after the last talk, and then Shanghai Opera, at Dec. 18 at venue. Banquet starts at 7:00 pm, Dec. 21, in the **Kingship Hotel (漢王飯店, 高雄市七賢三路 98 號 No.98 Cisian 3rd.Rd Kaohsiung, +886-7-5313131)**, which is close to the O2 metro train station.