Coherence manipulation under incoherent operations

白朝芳
厦门大学

Abstract: Coherence manipulation is fundamental in the study of resource theory of quantum coherence. It is aimed to identify when it is possible to convert a given coherent state to another using only incoherent operations. In this note, it is shown that finite number of measure conditions are not sufficient to characterize coherence manipulation on general mixed states. Further, finite number of measure conditions to classify coherence manipulation on subspace-independent states are found. For the input pure state, we also furnish a structural characterization of coherence manipulation in terms of finite number of measure conditions.

Perturbation theory for ideals in Banach algebras

曹鹏
北京理工大学
Abstract: In this talk, we will give some characterizations of ideals in (semisimple) Banach algebras from the side of spectrum theory. Here, the ideals mean the scattered radical, kernel-hull closure of the socle, socle, and radical. We will some necessary and sufficient conditions to describe these ideals by the perturbation of full spectrum.

Closed range weighted composition operators on the Hardy space

陈建华
湖南科技大学

Abstract: Our recent progress on closed range weighted composition operators on the Hardy space on the disc will be reported. The sufficient conditions are given in terms of the composition functions and weight functions. This survey is motivated by the infinite-time exact observability of Volterra systems in Hilbert spaces, a problem from the field of infinite-dimensional linear systems.
Two Weight Inequalities for Positive Operators: 
Doubling Cubes

Abstract: For the maximal operator $M$ on $\mathbb{R}^d$, and $1 < p, \rho < \infty$, there is a finite constant $D = D_{p,\rho}$ so that this holds. For all weights $w, \sigma$ on $\mathbb{R}^d$, the operator $M(\sigma \cdot)$ is bounded from $L^p(\sigma) \rightarrow L^p(w)$ if and only the pair of weights $(w, \sigma)$ satisfy the two weight $A_p$ condition, and this testing inequality holds:

$$\int_Q M(\sigma 1_Q)^p dw \leq \sigma(Q),$$

for all cubes $Q$ for which there is a cube $P \supset Q$ satisfying $\sigma(P) < D\sigma(Q)$, and $\ell(P) = \rho \ell(Q)$. This was recently proved by Kangwei Li and Eric Sawyer. We give a short proof, which is easily seen to hold for several closely related operators. This is a joint work with Michael Lacey. Moreover, we also discuss a multilinear version.

Ranks of commutators of truncated Toeplitz operators

陈泳
杭州师范大学
Abstract: Motivated by our recent result asserting that a finite rank commutator of two truncated Toeplitz operators can not have an odd rank, we study the rank of commutators of truncated Toeplitz operators with several type of inner symbols. One of our results shows that there is a commutator of two truncated Toeplitz operators on a general model space whose rank is any even integer. This result extends a known result to general model spaces.

Observable-geometric phases and application

陈泽乾
中国科学院武汉物理与数学研究所

Abstract: In this talk, we will report an alternative approach to geometric phases from the observable point of view. Precisely, we introduce the notion of observable-geometric phases, which is defined as a sequence of phases associated with a complete set of eigenstates of the observable. The observable-geometric phases are shown to be connected with the geometry of the observable space evolving according to the Heisenberg equation. It is shown that the observable-geometric phases can be used to realize a universal set of quantum gates in quantum computation. Also,
we will discuss the possibility of observable-geometric phases as the zeros of the Riemann zeta function.

The Regularity of Random Bergman Functions

程国正

中山大学

Abstract: In this talk, we consider the classical Littlewood’s theorem on Bergman spaces. In detail, let

$$(\mathcal{R}f)(z) = \sum_{n=0}^{\infty} \pm a_n z^n, \quad f(z) = \sum_{n=0}^{\infty} a_n z^n \in H(D).$$

Firstly, the space $\{ f \in H(D) : P\{ \mathcal{R}f \in L^p_a \} = 1 \}$ is characterized entirely. Moreover, we completely determine the $pq$-graph of $\mathcal{R} : L^p_a \to L^q_a$.

The $L^p$-$L^q$ Problems of Bergman-type operators

丁立家

北京大学

Abstract: Let $B^d$ be the unit ball on the complex space $C^d$ with normalized Lebesgue measure $dv$. For $\alpha \in \mathbb{R}$, the Bergman-type integral operator $K_\alpha$ on $L^1(B^d, dv)$ is defined by

$$K_\alpha f(z) = \int_{B^d} \frac{f(w)}{(1 - \langle z, w \rangle)^\alpha} dv(w).$$
It is an important class of operators in the holomorphic function space theory over the unit ball. We also consider the integral operator $K^+_\alpha$ on $L^1(B^d, dv)$ which is given by

$$K^+_\alpha f(z) = \int_{B^d} \frac{f(w)}{|1 - \langle z, w \rangle|^{\alpha}} dv(w).$$

In this talk, we mainly concern the $L^p$-$L^q$ boundedness and compactness of $K^+_\alpha, K^+_{\alpha}$. We will give some equivalent characterization of the $L^p$-$L^q$ boundedness of $K^+_\alpha, K^+_{\alpha}$ and compactness of $K^+_{\alpha}$. The results of boundedness are in fact the Hardy-Littlewood- Sobolev type theorem but also prove the conjecture of [G. Cheng et al, Trans. AMS, 2017] in the case of bounded domain $B^d$. Meanwhile, a trace formula and some sharp norm estimates of $K^+_\alpha, K^+_{\alpha}$ are given.
Weyl’s theorem and its perturbations for the functions of operators

董炯
陕西师范大学

Abstract: In this talk, using the generalized Weyl spectrum, we study the stability of Weyl’s theorem for $T^n$ and characterize the sufficient conditions for $T^n$ not satisfying the stability of Weyl’s theorem. Moreover, we explore the relationship between the stability of Weyl’s theorem for $T$ and the stability of Weyl’s theorem for $T^n$.

Some applications of block-operator technique and spectral theory

杜鸿科
陕西师范大学

Abstract: In this talking, we will give some examples to study the alternative proofs by different viewpoints.
**Toeplitz operators on weighted harmonic Bergman spaces**

段永江

东北师范大学

**Abstract:** In this talk, we first introduce Condition (L) and (B) to describe the bounded Toeplitz operator $T_g$ with integrable symbols on the regular weighted Bergman space $L^1_a(\omega)$. In addition, we discuss the boundedness and compactness of the Toeplitz operator $T_\mu$ from $L^p_h(\omega)$ to $L^q_h(\omega)$ for $1 < p, q < \infty$, where $\mu$ is a positive Borel measure. This is a joint work with Professor Kunyu Guo, Siyu Wang and Zipeng Wang.

**Tracial Approximation in Simple $C^*$-algebras**

符玄龙

复旦大学上海数学中心

**Abstract:** In this talk, we introduce a new idea of tracial approximation, with its root in Huaxin Lin’s tracial rank. Correspondingly, we have tracially nuclear, tracial nuclear dimension, tracially $Z$-stable, and so on. Using these notions, we show that a
tracial version of Toms-Winter conjecture (the part of equivalence between finite nuclear dimension and $\mathcal{Z}$-stability) holds. This is a joint work with Huaxin Lin.

The Kozlov completeness problem

郭坤宇
复旦大学

Abstract: The classical completeness problem raised by Beurling(1945) and independently by Wintner(1944-1945) asks for which $\psi \in L^2(0, 1)$, the dilation system $\{\psi(kx) : k = 1, 2, \cdots\}$ is complete in $L^2(0, 1)$, where $\psi$ is identified with its odd 2-periodic extension on $\mathbb{R}$. This difficult problem is nowadays commonly called as the Periodic Dilation Completeness Problem (PDCP). The PDCP has a natural link with the famous Riemann Hypothesis. Since the set of simple functions on $(0, 1)$ is dense in $L^2(0, 1)$, ones focus on the above problem for the class of characteristic functions. Let $\chi_s$ be the characteristic function of $(0, s)$, $0 < s \leq 1$, and $D_s = \{\chi_s(kx) : k = 1, 2, \cdots\}$. The Kozlov completeness problem is to ask for which $s$, the dilation system $D_s$ is complete(1948-1950). In this talk, I will give a brief introduction for what we
have made some significant progress on the PDCP and the Kozlov problem. This is a joint work with Dr. Dan.

**New progress for the difference of composition operators on the spaces of holomorphic functions**

郭鑫

武汉大学

**Abstract:** We introduce the new progress for the difference of composition operators on the different spaces of holomorphic functions. This is a joint work with professor Maofa Wang.

**摘要:** 目前量子计算机无法规模商用的主要障碍之一是：所提供的量子比特位数量少。但是在现有技术水平下，增加量子比特位数往往导致量子计算机的门错误率大增。为应对这个困局，应明生教授提出一个可行的设想：就是将大型量子程序分离成子系统上的程序的张量积，从而可以在比特位数少且精确率高的量子计算机上有效运行。这就是量子程序
Entanglement witnesses constructed by permutation pair

侯晋川

太原理工大学

Abstract: For \( n \geq 3 \), we construct a class of \( n^2 \times n^2 \) hermitian matrices \( W_{n,\pi_1,\pi_2} \) by the permutation pair \( \{\pi_1, \pi_2\} \) of \( (1, 2, \ldots, n) \) and show that \( W_{n,\pi_1,\pi_2} \) is an entanglement witness of the \( n \otimes n \) system if \( \{\pi_1, \pi_2\} \) has the property (C). We prove that \( W_{n,\pi_1,\pi_2} \) is not comparable with \( W_{n,\pi} \), the entanglement witness constructed from a single permutation \( \pi \); \( W_{n,\pi_1,\pi_2} \) is decomposable if \( \pi_1\pi_2 = \text{id} \) or \( \pi_1^2 = \pi_2^2 = \text{id} \). For the case \( n = 3, 4 \), we give the sufficient and necessary condition on \( \pi_1, \pi_2 \) for \( W_{n,\pi_1,\pi_2} \) to be an entanglement witness. Particularly, for \( n = 3 \) or 4, \( W_{n,\pi_1,\pi_2} \) is decomposable if and only if \( \pi_1\pi_2 = \text{id} \) or \( \pi_1^2 = \pi_2^2 = \text{id} \); \( W_{3,\pi_1,\pi_2} \) is optimal if and only if \( (\pi_1, \pi_2) = (\pi, \pi^2) \), where \( \pi = (2, 3, 1) \).
Composition operators between distinct Bergman spaces over planar domains

黄寒松
华东理工大学

Abstract: Composition operators has been a hot spot at the intersection of operator theory and function theory. Concerning composition operators mapping one Hilbert reproducing kernel space to another, still there are many issues under consideration. In this talk, we focus on composition operators between distinct Bergman spaces over planar domains. It is shown that the smoothness on boundary of the domain plays an important role in our consideration. An interplay of function theory, geometry, and operator theory is revealed. Though this may be just a try.

Broadcasting problem in the perspective of quantum networks

黄旻怡
浙江理工大学

Abstract: Quantum networks is an important research field and considered as the foundation of future quantum technologies.
The broadcasting problem, which arises from the quantum cloning machine, has drawn peculiar interests in recent studies of quantum information. This problem is of great importance when there is an exigency in increasing the number of available entangled pairs. Thus it is natural and necessary to study the broadcasting problem in the perspective of quantum networks. We first discuss how the optimal cloning of unitary transformations can help in the broadcasting tasks. Then, we further studies the effect of quantum networks in this scenario, especially for some relatively simple networks. This will help us in exploring the properties, e.g., correlations, and potential applications of quantum networks.

Double disjointness preservers of Fourier and Fourier-Stieltjes algebras of locally compact groups

黄毅青
台湾中山大学

Abstract: This talk is devoted to the study of orthogonality and disjointness preserving linear maps between Fourier and Fourier-Stieltjes algebras of locally compact groups. We show that a linear bijection \( \psi : A(G_1) \to A(G_2) \) (resp. \( \psi : B(G_1) \to \)
$B(G_2)$) between two Fourier algebras (resp. Fourier-Stieltjes algebras) of locally compact groups will induce a topological group isomorphism between $G_1$ and $G_2$, provided that $\psi$ preserves both disjointness and some kinds of orthogonality. This is a joint work with Anthony To-Ming Lau of University of Alberta.

**Subdiagonal algebras with Beurling type invariant subspaces**

吉国兴
陕西师范大学

**Abstract:** In this talk, we will discuss subdiagonal algebras whose right invariant subspaces in the associated noncommutative $H^2$ space is of Beurling’s type, in a von Neumann algebra. Let $\mathcal{A}$ be a maximal subdiagonal algebra in a $\sigma$-finite von Neumann algebra $\mathcal{M}$. If every right invariant subspace of $\mathcal{A}$ in the non-commutative Hardy space $H^2$ is of Beurling type, then we say $\mathcal{A}$ is of type 1. We determine generators of these algebras and consider a Riesz type factorization theorem for the non-commutative $H^1$ space. We show that the right analytic Toeplitz algebra on the non-commutative Hardy space $H^p$ associated with a type 1 subdiagonal algebra with
multiplicity 1 is hereditary reflexive.

**On the similarity of Cowen-Douglas operators with index one**

纪奎
河北师范大学

**Abstract:** In this talk, we introduce a new operator class of Cowen-Douglas operators with index two denoted by $NFB_2(\Omega)$. We consider the unitarily classification of operators in $NFB_2(\Omega)$. As application, we give a similarity classification theorem of Cowen-Douglas operators with index one.

拟局部Roe代数的相关问题

蒋报捷
重庆大学

**摘要:** 我们将回顾拟局部Roe代数的一些背景与基本性质。此外，我们还将介绍该领域的已有成果和最新进展，以及我们希望得到什么样的结果。
Positive representations of $C_0(X)$

Abstract: If $X$ is a locally compact Hausdorff space, then a representation of the complex algebra $C_0(X)$ on a Hilbert space $H$ is given by a spectral measure. This measure takes its values in the orthogonal projections on $H$. It is a natural question to ask whether something similar is true for a positive representation of the ordered Banach algebra $C_0(X)$ on a Banach lattice $E$. If $E$ is a KB-space, then the answer is affirmative: the representation is given by a spectral measure that takes its values in the positive projections on $X$; see [1]. The proofs in [1] make use of the fact that $E$ is a Banach space, but there are some results in [1] suggesting that a purely order-theoretic more general approach might also be possible. In this lecture, we shall explain that this is indeed the case. As a preparation, we shall sketch an integration theory for measures taking values in a suitable partially ordered vector space $E$. After that, we shall discuss a Riesz representation theorem for a positive map $T \in C_0(X) \to E$. Under mild conditions, this is given by a positive $E$-valued measure. In the next step, we apply
the previous result to a positive representation $\pi \in C_0(X) \to A$, where $A$ is a suitable partially ordered algebra. In that case, the pertinent positive $A$-valued measure turns out to take values in the idempotents of $A$.

If $A$ equals the regular operators on a suitable partially ordered vector space $E$, then the previous result yields a spectral measure for $\pi$ that takes its values in the positive projections on $E$. In 2017, Vladimir Troitsky mentioned us the space of all self-adjoint operators on a Hilbert space would fit into the picture. Based on this results, we even give the representation theorem of the complex algebra $C_0(X)$ on a Hilbert space $H$. In the end, we discuss which positive representation could automatically be a lattice homomorphism. This is joint work with Marcel de Jeu.

References


Composition Operators on Dilichlet Spaces over the Half-plane

李海绸

华南农业大学
Abstract: As continuation of the study of polynomial approximation and composition operators on Dirichlet spaces of unit disk, which has settled a problem posed by Cima in 1976, this paper aims to consider the case of the unbounded domains, such as the half-plane. Specifically, we may obtain the rational approximations in the Dirichlet spaces and characterize the composition operators which has dense range on the Dirichlet spaces over the half-plane. Moreover, this paper also consider the relationship between the Dirichlet spaces and Hardy spaces on half-plane. This is a joint work with Professor Guangfu Cao.

On the C*-algebra of the product of two odometers

李辉
华北电力大学

Abstract: In this talk, we report the properties of the C*-algebra of the product of two odometers, including the amenability, UCT, simplicity, purely infiniteness, the structure of KMS states simplex, the ideal structure. This is a series of joint work with Dilian Yang.
Preservers in function spaces

李磊
南开大学

Abstract: In this talk, I will introduce some recent results about linear preservers on some function spaces. In particular, I will talk about the order isomorphism on differentiable function spaces, the inverse of disjointeness preserving maps, and weak local isometries on uniform algebras.

Conjugations and complex symmetric Toeplitz operators

李然
辽宁师范大学

Abstract: In this talk, we first introduce the definition and examples of the complex symmetric operator. Secondly, we give the characterization for complex symmetric Toeplitz operators on Hardy space and Bergman space with fixed conjugations as examples, respectively. Finally, we show an explicit description of conjugations on the Hilbert space and define the basic spectrum
of an antilinear bounded operator which can distinguish conjugations, to replace the classical spectrum. Due to this, we use the unitary equivalent to characterize the complex symmetric Toeplitz operator.

**Weighted Bergman spaces induced by doubling weights in the unit ball of \( C^n \)**

李颂孝

电子科技大学

**Abstract:** This talk is devoted to the study of the weighted Bergman space \( A^p_\omega \) in the unit ball of \( C^n \) with doubling weight \( \omega \) satisfying

\[
\int_r^1 \omega(t) dt < C \int_{1+r}^{1+2r} \omega(t) dt, \quad 0 \leq r < 1.
\]

The \( q \)-Carleson measures for \( A^p_\omega \) are characterized in terms of a neat geometric condition involving Carleson block. Some equivalent characterizations for \( A^p_\omega \) are obtained by using the radial derivative and admissible approach regions. The boundedness and compactness of Volterra integral operator \( T_\gamma : A^p_\omega \to A^q_\omega \) are investigated in this talk. The Bergman projection and Toeplitz operator
are also discussed in this talk. This is a joint work with Juntao Du, Xiaosong Liu, and Yecheng Shi.

The First Szegö Theorem of the Bergman Toeplitz Matrix

李永宁
重庆工商大学

Abstract: In this talk, I will focus on the asymptotic behavior of the determinants of Bergman Toeplitz matrices with symbols in $H^\infty(D) + C(D)$. This is a joint work with Ziliang Zhang, Xianfeng Zhao and Dechao Zheng. We establish a criterion of the asymptotic invertibility and an asymptotic inversion formula for Bergman Toeplitz operators. These results are applied to obtain two versions of the first Szegö theorem for Bergman Toeplitz matrices. Moreover, we describe the asymptotic distribution of singular values of Bergman Toeplitz matrices.

On the norm of Hankel operator restricted to Fock space

李玉成
河北师范大学
Abstract: In this talk, we characterize the norm of Hankel operator $H_\bar{z}$ and give the formula of the norm of $H_\bar{z}^n(g)$ on Fock space. Then we prove the concomitant operator $P_n$ of $H_\bar{z}^n$ is quasi-affine to the direct sum of $n$ copies of the concomitant operator $P_1$ of $H_\bar{z}$.

Krein-Milman type theorems for $C^*$-algebras

李智强
重庆大学

Abstract: In this talk, we present analogue results of the remarkable Krein-Milman theorem for certain $C^*$-algebras. This is a joint work with G. Elliott and X. Zhao.

A Generalization of Littlewood’s Theorem on Random Taylor Series via Gaussian Processes

刘超
复旦大学

Abstract: We generalize Littlewood’s theorem on random analytic functions to not necessarily independent Gaussian processes. We show that if we randomize a function in the Hardy space
$H^2(D)$ by a Gaussian process whose covariance matrix $K$ induces a bounded operator on $l^2$, then the resulting random function is almost surely in $H^p(D)$ for any $p \geq 2$. The case $K = I$, the identity operator, recovers Littlewood’s theorem. A new ingredient in our proof is to recast the membership problem as the boundedness of an operator. This reformulation enables us to use tools in functional analysis and is applicable to other situations. Several ramifications are discussed. This is a joint work with Kunyu Guo, Xiang Fang and Guozheng Cheng.

**Average values of functionals and concentration without measure**

刘成仕
东北石油大学

**Abstract:** Although there doesn’t exist the Lebesgue measure in the ball $M$ of $C[0, 1]$ with $p$–norm, the average values (expectation) $EY$ and variance $DY$ of some functionals $Y$ on $M$ can still be defined through the procedure of limitation from finite dimension to infinite dimension. In particular, the probability densities of coordinates of points in the ball $M$ exist and are derived
out even though the density of points in $M$ doesn’t exist. These densities include high order normal distribution, high order exponent distribution. This also can be considered as the geometrical origins of these probability distributions. Further, the exact values (which is represented in terms of finite dimensional integral) of a kind of infinite-dimensional functional integrals are obtained, and specially the variance $D_Y$ is proven to be zero, and then the nonlinear exchange formulas of average values of functionals are also given. Instead of measure, the variance is used to measure the deviation of functional from its average value. $D_Y = 0$ means that a functional takes its average on a ball with probability 1 by using the language of probability theory, and this is just the concentration without measure. In addition, we prove an important results, that is, the average value depends on the discretization.

**A toolkit for constructing dilations of operator-valued measures, bounded linear maps and frames**

刘锐

南开大学
Abstract: In our AMS Memoir, we gave a general dilation theory of operator-valued measures (OVMs), bounded linear maps and frames, which led to many natural questions concerning special types of dilations. In particular, it is not known whether ultraweakly-wot continuous maps can be dilated to ultraweakly-wot continuous homomorphisms. We answer this question affirmatively for the case when the domain algebra is an abelian vN-algebra. It is well known that completely bounded OVMs correspond to the existence of projection-valued dilations in the sense of Naimark and Stinespring. With the aim of classifying OVMs from the dilation point of view, we prove that any OVM with finite p-variation can be dilated to a projection-valued measure of the same type. Recently, we generalize the above dilation results to Quantum Measures (OVMs on vN-algebra projection lattices), and obtain the Jordan-homomorphism dilation theorem, joint with David R. Larson and Deguang Han.

A new characterization for Carleson measure on the unit ball of $\mathbb{C}^n$

刘小松

嘉应学院
Abstract: We provide a new characterization for Carleson measures in terms of the $L^p(S_n)$ norm of certain functions represented as an integration on admissible approach region on the unit ball of $\mathbb{C}^n$. Some of the tools used in the proof of one dimensional case or $\mathbb{R}^n$ are not available in higher dimensions, such as Calderón-Zygmund decomposition. We need the theory of duality and maximal functions of $L^p(S_n)$ on the unit ball of $\mathbb{C}^n$. This is a joint work with Zengjian Lou and Ruhan Zhao.

Twisted Bounded-dilation Group $C^\ast$-algebras as $C^\ast$-metric algebras

龙波涛
南京航空航天大学

Abstract: We construct a class of $C^\ast$-metric algebras. We prove that for a discrete group $\Gamma$ with a 2-cocycle $\sigma$, the closure of the seminorm $\| [M_\ell, \cdot] \|$ on $C_c(\Gamma, \sigma)$ is a Leibniz Lip-norm on the twisted reduced group $C^\ast$-algebra $C^\ast_r(\Gamma, \sigma)$ for the pointwise multiplication operator $M_\ell$ on $\ell^2(\Gamma)$, induced by a proper length function $\ell$ on $\Gamma$ with the property of bounded $\theta$-dilation. Moreover, the compact quantum metric space structures depend only on the
cohomology class of 2-cocycles in the Lipschitz isometric sense. This is a joint work with Wei Wu.

The reducibility of compressed shifts on Beurling type quotient modules over the bidisk

卢玉峰
大连理工大学

Abstract: In this talk, we introduce the compressed shift operator $S_{z_1}$ on the Beurling-type quotient module $\mathcal{K}_\theta$ of Hardy space $H^2(D^2)$ over the bidisk. Firstly, we introduce the pure isometry reducing subspace and Agler reducing subspaces. Secondly, we introduce the reducibility of $S_{z_1}$ for a rational inner function with degree $(n, 1)$. Lastly, we introduce the reducibility of a class of special compressed shift which called $C_0(2)$ operator.

Mixed products of Toeplitz and Hankel operators on the Fock space

马攀
中南大学

Abstract: For entire functions $f$ and $g$ we determine exactly when the product of the Hankel operator $H_T$ and the Toeplitz
operator $T_g$ is bounded on the Fock space. This solves a natural companion to Sarason’s Toeplitz product problem. This is joint work with Fugang Yan, Dechao Zheng, Kehe Zhu.

**Invariant means and property $T$ of crossed products**

孟庆
曲阜师范大学

**Abstract:** Let $\Gamma$ be a discrete group that acts on a semi-finite measure space $(\Omega, \mu)$ such that there is no $\Gamma$-invariant function in $L^1(\Omega, \mu)$. We show that the absence of $\Gamma$-invariant mean on $L^\infty(\Omega, \mu)$ is equivalent to the property $T$ of the reduced $C^*$-crossed product of $L^\infty(\Omega, \mu)$ by $\Gamma$.

**Additive maps preserving $r$-nilpotent perturbation of scalars on $\mathcal{B}(H)$**

齐霞霏
山西大学

**Abstract:** Let $H$, $K$ be Hilbert spaces over the real or complex field $\mathbb{F}$ with $\dim H \geq 3$ and $r \geq 3$ be a positive integer. It is shown that a surjective additive map $\Phi : \mathcal{B}(H) \to \mathcal{B}(K)$
preserves $r$-nilpotent perturbation of scalars in both directions if and only if either $\Phi(T) = cATA^{-1} + \phi(T)I$ for all $T \in \mathcal{B}(H)$ or $\Phi(T) = cAT^*A^{-1} + \phi(T)I$ for all $T \in \mathcal{B}(H)$, where $c$ is a nonzero scalar, $A : H \to K$ is a $\tau$-linear bijective map for some automorphism $\tau$ of $\mathbf{F}$ and $\phi : \mathcal{B}(H) \to \mathbf{F}$ is an additive functional. As applications, for any integer $k \geq 5$, additive $k$-commutativity preserving maps and general completely $k$-commutativity preserving maps on $\mathcal{B}(H)$ are characterized, respectively.

**Combinatorial Independence and Naive Entropy**

荣祯
内蒙古财经大学

**Abstract:** We study the independence density for finite families of finite tuples of sets for continuous actions of discrete groups on compact metrizable spaces. We use it to show that actions with positive naive entropy are Li-Yorke chaotic and untame. In particular, distal actions have zero naive entropy. This answers a question of Lewis Bowen.
Irreducible and reducible operators in factor von Neumann algebras

Abstract: Let $\mathcal{B}(\mathcal{H})$ denote the set of bounded linear operators on a complex separable Hilbert space $\mathcal{H}$. A starting point of research on irreducible operators is due to Halmos about the density of irreducible operators in the operator norm topology. Since then there are many related works about irreducible and reducible operators. Note that $\mathcal{B}(\mathcal{H})$ is a properly infinite, type I factor von Neumann algebra. A natural question is what we can say about irreducible and reducible operators in each type of factor von Neumann algebras. In this talk, we consider several related problems about irreducible and reducible operators in factor von Neumann algebras.

Reducing subspace for Toeplitz operators with some non-analytic symbols

Reducing subspace for Toeplitz operators with some non-analytic symbols

Abstract: Let $\mathcal{B}(\mathcal{H})$ denote the set of bounded linear operators on a complex separable Hilbert space $\mathcal{H}$. A starting point of research on irreducible operators is due to Halmos about the density of irreducible operators in the operator norm topology. Since then there are many related works about irreducible and reducible operators. Note that $\mathcal{B}(\mathcal{H})$ is a properly infinite, type I factor von Neumann algebra. A natural question is what we can say about irreducible and reducible operators in each type of factor von Neumann algebras. In this talk, we consider several related problems about irreducible and reducible operators in factor von Neumann algebras.
Abstract: In this talk, we introduce some recent results concerning reducing subspaces for Toeplitz operators whose symbols are not analytic on Bergman type spaces. Firstly, we introduce a uniform characterization when the symbol \( \varphi(z) = z^k + \bar{z}^l \) (\( z \in D^2, k, l \in \mathbb{Z}_+ \)). Secondly, we characterize the minimal reducing subspaces for Toeplitz operator with quasi-homogeneous symbol, and give several interesting examples on the Bergman type spaces over bidisk and disk respectively. Finally, we state these results in terms of the commutant algebra.

Finite Group and the Quantum Isometry Group

陶继成
中国计量大学

Abstract: In this report, we introduces some related contents of finite groups and quantum isometric groups. The main principle is to find the generator set of a finite group and construct a compact spectral triples. Then we use the representation theory of quantum groups to obtain a quantum isometric group. Recently, we mainly discuss the structure of quantum isometric group of the Dihedral group \( D_{2(2n+1)} \), the discrete Heisenberg groups
\[ \Gamma_{\mathbb{Z}_k}, k > 1 \] and the finite groups \( GL_2(\mathbb{Z}_3) \). We show that the quantum isometry groups for this finite groups \((G, S)\) coincides with \( C^*(G, S) \oplus C^*(G, S) \), where \( C^*(G, S) \oplus C^*(G, S) \) is the doubling of \( C^*((G, S), \triangle) \) corresponding to a given automorphism \( \theta \).

**Correlations in evolutions of quantum systems**

王海

浙江大学

**Abstract:** Using auxiliary systems to record evolutions of a system, we can study the correlation hidden in the evolution of quantum systems. Also, a new trade-off relation is gotten.

辫群的Baum-Connes同构的构造

王航

华东师范大学

**摘要:** 纯辫子群是由自由群的多层扩张而得到的一个无挠离散群。源自辫子群与低维拓扑、冯诺依曼代数和规范理论中的紧密联系，我们研究纯辫子群的Baum-Connes同构，给出三弦和四弦的纯辫子群的Baum-Connes同构的具体构造，
Delocalized eta invariants, cyclic cohomology and higher rho invariants

Abstract: Let $M$ be a closed spin manifold equipped with a positive scalar curvature metric. In this talk, I will introduce a pairing between $K$-theoretical higher rho invariant and Connes’ cyclic cohomology of the group algebra of the fundamental group of $M$. Under some suitable assumption, this paring recovers John Lott’s higher eta invariants. As an application, we prove a delocalized higher Atiyah-Patodi-Singer theorem for manifolds with boundary. This is joint work with Xiaoman Chen, Zhizhang Xie and Guoliang Yu.

Rigidity of the determinantal point processes

王凯
复旦大学
Abstract: In sharp contrast to the classical Bergman kernels, we show the existence of DPP’s associated with infinite rank lacunary Bergman kernels which satisfy the Ghosh-Peres number rigidity. This is a joint work with prof. Yanqi Qiu.

Rigidity of Volterra-type integral operator on the Hardy spaces

王茂发
武汉大学

Abstract: We show that the compactness, strict singularity and $p-$singularity of the Volterra-type integral operator $J_b : H^p(B^n) \to H^p(B^n)$ for $1 \leq p < \infty$ are equivalent. This talk is based on a joint paper with Santeri Miihkinen, Jordi Pau and Antti Perala.

Eigenvalue problems for stochastic Hamiltonian systems with boundary conditions

王鹏辉
山东大学

Abstract: In this talk, I will talk about some recent progress on the eigenvalue problems for stochastic Hamiltonian systems
with boundary conditions. The eigenvalue problem for the deterministic differential equations plays important role in many problems, and there are many many efforts on this problem. However there are only a few works on this subject. The talk based on a joint work with Guangdong Jing.

Operator theory on Fock-type spaces

王晓峰
广州大学

Abstract: In this talk, we will first introduce results of Hankel Operators and \textit{BMO} on Fock-Type Spaces $F^2_\Psi(\mathbb{C}^n)$. Further, we will discuss the Bergman projection $P$ and Toeplitz operators $T_\mu$ with positive measure symbol $\mu$ between Fock-Type Spaces $F^p_\Psi(\mathbb{C}^n)$ and $F^q_\Psi(\mathbb{C}^n)$ for $1 \leq p, q \leq \infty$. We show that $P$ is a bounded projection from $L^p_\Psi(\mathbb{C}^n)$ onto $F^p_\Psi(\mathbb{C}^n)$ when $1 \leq p \leq \infty$, and then apply it to obtain results on the complex interpolation and the duality of the Fock-type spaces. Moreover, we obtain the equivalent conditions for the boundedness and compactness of $T_\mu$ in terms of the averaging function and the Berezin transform.
The symmetry of field algebra in Hopf spin models
determined by a Hopf ∗-subalgebra

魏晓敏, 蒋立宁, 辛巧玲
北京理工大学, 天津师范大学

Abstract: Given a cocommutative finite dimensional Hopf $C^*$-algebra $H$, and its Hopf ∗-subalgebra $H_1$ which is also cocommutative, $D(H, H_1)$ is the crossed product of the opposite dual $\widehat{H}^{op}$ of $H$ and $H_1$ with respect to the coadjoint representation latter acting on the former. One can construct the observable algebra $\mathcal{A}_{H_1}$ determined by $H_1$. And $D(H, H_1)$-comodule algebra structure of $\mathcal{A}_{H_1}$ determines that $\mathcal{A}_{H_1}$ is a $D(\widehat{H}, H_1)$-module algebra, then the field algebra $\mathcal{F}_{H_1}$ can be obtained as the crossed product $\mathcal{A}_{H_1} \odot D(\widehat{H}, H_1)$ such that the observable algebra $\mathcal{A}_{H_1}$ is a $D(H, H_1)$-invariant subalgebra of $\mathcal{F}_{H_1}$. Further there exists a unique $C^*$-representation of $D(H, H_1)$ such that $D(H, H_1)$ and $\mathcal{A}_{H_1}$ are commutants with each other.
Wandering subspace property of the shift operator $B_0^2$ on the weighted Bergman space

吴常晖
大连理工大学

Abstract: Let $H^2(D^2)$ be the Hardy space over the bidisk $D^2$, and let $M_0 = [(z - w)^2]$ be the submodule generated by $(z - w)^2$. The related quotient module is denoted by $N_0 = H^2(D^2) \ominus M_0$. In this paper, by lifting the shift operator $B_0^2$ on the weighted Bergman space $L_a^2(dA_2)$ as the compression of an isometry on a closed subspace of $N_0$, we prove that the shift operator $B_0^2$ possesses wandering subspace property on the $H_a$ type submodules of the weighted Bergman space $L_a^2(dA_2)$.

Quantum Fourier Analysis: Locally Compact Quantum Groups

吴劲松
哈尔滨工业大学

Abstract: In this talk, I will briefly introduce the history from groups to quantum groups in the sense of operator algebras. The Fourier transform is fundamental in the theory of
abelian group theory. However, it is not easy to handle it in non-abelian case. By the techniques in the theory of noncommutative $L_p$ space and taking the advantage of topological ideas from subfactor theory, we prove some inequalities in Fourier analysis for locally compact quantum groups such as Young’s inequalities, uncertainty principles and their extremizers etc.

**Normal states are determined by their facial distances**

吴志强
南开大学

**Abstract:** Let $M$ be a semi-finite $W^*$-algebra with normal state space $S(M)$. For any $\phi \in S(M)$, let $M_\phi := \{ x \in M : x\phi = \phi x \}$ be the centralizer of $\phi$ with center $Z(M_\phi)$. We show that for $\phi, \psi \in S(M)$, the following are equivalent.

- $\phi = \psi$.
- $Z(M_\psi) \subseteq Z(M_\phi)$ and $\phi|_{Z(M_\phi)} = \psi|_{Z(M_\phi)}$.
- $\phi, \psi$ have the same distances to all the closed faces of $S(M)$.

We are then able to give an alternative proof of the fact that metric preserving surjections between normal state spaces of semi-finite
$W^*$-algebras are induced by Jordan $^*$-isomorphisms between the underlying algebras. Applications to $F$-algebras (in particular, Fourier and Fourier-Stieltjes algebras of locally compact quantum groups) are provided. This talk is based on a joint work with A.T.M. Lau and N.C. Wong.

非耗散退相干下的量子关联

熊春河
中山大学

摘要: 迄今为止，量子技术发展的主要障碍是量子系统与其环境之间不可避免的相互作用而导致的所有量子特性的破坏，即退相干。我们发现，在非耗散退相干下，量子关联不会随时间完全衰退到零。特别地，存在一类量子态的量子关联不受该退相干的影响。目前还不知道这种现象是否可以在更一般的环境中观察到。在一定条件下对量子算法有用的量子关联完全不受环境的影响，这一事实可能构成量子技术的一个新的突破，如量子计算机。
Analysis on quantum tori

许全华

Université de Franche-Comté, Harbin Institute of Technology

Abstract: Quantum tori are fundamental examples in operator algebras and noncommutative geometry. Their algebraic and geometric aspects have been well understood. However, the study on their analytic aspect has been started only recently. This talk will give a brief survey of the recent development on analysis on quantum tori. We will present two families of results: the first one concerns the convergence of Fourier series, and the second deals with the embedding and characterizations of Sobolev and Besov spaces. As application to noncommutative geometry, we will discuss the very recent results of Sukochev et al on Connes’ quantized differential calculus on quantum tori.

Products of Hankel operators on Fock spaces

晏福刚

重庆大学

Abstract: For entire functions \( f \) and \( g \) we study the problem of when the Hankel product \( H_f^*H_g \) (resp. the mixed Haplitz
product $H_fT_g$ is bounded or compact on the Fock space $F^2_\alpha$. This is a companion to Sarason’s Toeplitz product problem which was completely solved for the Fock space by Cho-Park-Zhu in 2014.

In this talk, we will show that the natural conjecture for the Hankel products on Fock space motivated by the Toeplitz product problem is false. Moreover, we will give a complete solution to the mixed Haplitz products problem on Fock space. This is a joint work with Pan Ma, Dechao Zheng, and Kehe Zhu.

**Quasiconformal Stuctures and Functional Analysis**

姚一隽
复旦大学

**Abstract:** Quasiconformal structures on topological manifolds are much weaker smoothness, yet in the past decades, Connes, Sullivan, Hilsum and others have investigated the quasiconformal manifolds using functional analysis tools, which we will give a brief survey in the talk.
Connes-Kasparov isomorphism and representation theory

余世霖
厦门大学

Abstract: Connes and Higson observed that the well-known Connes-Kasparov isomorphism in the theory of operator algebra suggests a mysterious bijection between the tempered dual of a real reductive Lie group $G$ and that of its Cartan motion group, which was also conjectured earlier by Mackey. Later the bijection was constructed by Afgoustidis. In this talk, I will show that this bijection follows naturally from deformation of representations of the group $G$. Part of the results is based on the joint work with Qijun Tan and Yijun Yao.

Constructions of one-way LOCC indistinguishable sets of generalized Bell states

原江涛
河南理工大学

Abstract: We mainly consider the local indistinguishability of the set of bipartite generalized Bell states (GBSs). We system-
atically show constructions of small sets of GBSs with cardinalities greatly smaller than $d$ which are not distinguishable by one-way local operations and classical communication (1-LOCC) in $d \otimes d$. The results give a unified upper bound for the minimum cardinality of 1-LOCC indistinguishable set of GBSs, and greatly improve previous results in [Zhang et al., Phys. Rev. A 91, 012329 (2015); Wang et al., Quantum Inf. Process. 15, 1661 (2016); Fan, Phys. Rev. A 75, 014305 (2007)].

\textbf{K–theory for $Lp$–Roe-algebras}

周大鹏
华东师范大学

\textbf{Abstract:} Higher index theory is closely related to a range of mathematical issues including the topology of manifold and metrics of positive scalar curvature. The higher indices of the Dirac type operators on a noncompact manifold live in the $K$–theory of the Roe algebra of the manifold. The coarse Baum-Connes conjecture gives an algorithm to compute the higher index. In this talk, we will discuss the $Lp$–version of the coarse Baum-Connes conjecture and show that the $K$–theory of the $Lp$–Roe-algebras is independent
of $p$ for spaces with finite asymptotic dimension. This is joint work with Jianguo Zhang.

**Random Bergman shifts**

朱森
吉林大学

**Abstract:** We define random Bergman shifts $B(\omega)$ which is a random model of non-selfadjoint, bounded linear operators on Hilbert space. We study $B(\omega)$ in comparison with random Toeplitz shifts and answer several basic questions concerning $B(\omega)$. In this talk we shall introduce some recent results concerning random Bergman shifts. Topics include spectral picture, classification, invariant subspace and dynamical properties.