

TITLES AND ABSTRACTS

1. Towards Tannaka-Krein duality for compact groupoids

MASSOUD AMINI

TARBIAT MODARES UNIVERSITY. IRAN

Abstract. We show that from the representation theory of a compact groupoid one can reconstruct the groupoid using a procedure similar to the Tannaka-Krein duality for compact groups. We study the Fourier and Fourier-Plancherel transforms and prove the Plancherel theorem for compact groupoids. We also study the central functions in the algebra of square integrable functions on the isotropy groups. We show that if irreducible representations of a compact groupoid separate its points, then the groupoid is isomorphic to its Tannaka groupoid.

2. Unitary Groups as a Complete Invariant

AHMED AL-RAWASHDEH

JORDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY . IRBID. JORDAN

Abstract In 1954, Dye proved that the unitary groups of von Neumann factors not of type I_{2n} determine the algebraic type of factors. Using Dye's result, Broise showed that any isomorphism between the unitary groups of two von Neumann factors not of type I_n is implemented by a linear or a conjugate linear $*$ -isomorphism between the factors. Using Dye's approach, we prove that the unitary groups determine the algebraic types for a large class of simple, unital C^* -algebras such as the tracial topological rank zero (TAF-algebras) whose K_1 groups are isomorphic and a large class of simple, unital purely infinite nuclear C^* -algebras. Indeed, If φ is an isomorphism between the unitary groups of such C^* -algebras (as above, including the irrational rotation algebras and the simple unital AF-algebras, the Cuntz algebras), then it induces a bijection between the sets of projections which preserves the orthogonality and the unitarily equivalence of projections, afterwards this mapping induces an isomorphism between their ordered K_0 -groups.

Joint with Thierry Giordano from Department of Mathematics and Statistics, University of Ottawa, Canada.

3. Boundary behaviour of Poisson integrals in boundary components of Riemannian Symmetric Spaces.

ABDELHAMID BOUSSEJRA

UNIVERSITY IBN TOFAIL. KENITRA. MOROCCO

Let $X = G/K$ be a Riemannian Symmetric space of the noncompact type and let P_θ be a standard parabolic subgroup of G with Langlands decomposition $P_\theta = M_\theta A_\theta N_\theta$. For λ in $(a_\theta)_c^*$, the complex dual of a_θ , $(a_\theta$

the Lie algebra of A_θ) let $B(G/P_\theta, \lambda)$ be the space of all hyperfunction valued sections of degenerate principal series on the boundary component G/P_θ . For $f \in B(G/P_\theta, \lambda)$ define its Poisson transform by

$$(P_\lambda f)(g) = \int_K f(gk) dk$$

Let U be the left ideal of $U(\mathfrak{g})$ the universal enveloping algebra of \mathfrak{g} whose elements annihilate the above Poisson integrals. Let $N(U)$ be the nullspace of U . That is $N(U) = \{F : X \rightarrow \mathcal{C}; DF = 0, \forall D \in U\}$. We suppose for instance that $N(U)$ satisfies the following assumption: (H) For λ varying in some subset of $(a_\theta)_\mathcal{C}^*$

$$N(U) = \text{Im} P_\theta$$

we can address the following problem: Find a necessary and sufficient condition on F in $N(U)$ such that F has an L^p -Poisson integral representation on the boundary component G/P_θ . This amounts to study the behavior of the Poisson integrals $P_\lambda f$, for f in G/P_θ . This will be the major subject of this talk

4. Fredholm properties of Toeplitz operators and Riemann-Hilbert problems

CRISTINA CÂMARA

INSTITUTO SUPERIOR TECNICO. LISBOA. PORTUGAL

Abstract. Invertibility criteria for Toeplitz operators with 2×2 symbols can be established from a non-trivial solution to an associated Riemann-Hilbert problem. We show that Fredholmness and other properties of those operators can also be studied from such a solution, provided that some corona type conditions are satisfied. We apply these results to some examples motivated by applications.

This is joint work with C. Diogo.

5. Inequalities for operators and applications

GILLES CASSIER

UNIVERSITY LYON

Abstract. Firstly, we speak about results on the constrained von Neumann inequalities and their applications to harmonic analysis (with C. Badea, *Advances in Math*). Secondly, we show how other constraints lead to sharpened forms of the von Neumann inequality and the interior Schwarz inequality (with N. Siciu, to appear in *Math. Scandinavica*). Finally, we give an inequality which is concerned with the hyperbolic metric for some operators.

6. C^* -algebras associated with commutative rings, number fields and function fields.

JUCHIM CUNTZ,
UNIVERSITY OF MUENSTER. GERMANY.

Abstract. We associate canonical C^* -algebras with integral domains and study their structure.

7. Physical Interpretation for the Arithmetico-Harmonic Mean of Several Positive Matrices

MUSTAPHA RAÏSSOULI AND MOHAMED CHERGUI
UNIVERSITÉ MOULAY ISMAIL, FACULTÉ DES SCIENCES, MEKNÈS,
MOROCCO

Abstract. Matrix means arise in various contexts and contribute as a good tool for solving many important problems. In recent few years, an enormous amount of effort has been devoted by many authors to understand the arithmetic, geometric and harmonic operator means. This work goes in the same sense. In this communication, we present an efficient algorithm defining the p -Arithmetico-Harmonic mean of several positive operators, when the space of linear operators is equipped with the strong convergence topology. We also establish some relations of approximation from which we deduce the rapidity of the convergence of the above mentioned algorithm. In order to illustrate the importance of our theoretical results, we present a physical interpretation to electrical connections together with some numerical examples.

8. Toeplitz algebras and spectral results for the one-dimensional Heisenberg model

MONDHER DAMAK (WITH MARIUS MANTOIU AND RAFAEL TIEDRA DE ALDECOA.).
FACULT DES SCIENCES DE SFAX. TUNISIA

Abstract. We determine the structure of the spectrum and obtain non-propagation estimates for a class of Toeplitz operators acting on a subset of the lattice \mathbb{Z}^N . This class contains the Hamiltonian of the one-dimensional Heisenberg model.

9. Schrödinger Operators over Local Fields

TROND DIGERNES (WITH V. S. VARADARAJAN AND D. WEISBART).
THE NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY.
NORWAY.

Abstract. We discuss a Feynman-Kac formula for the propagator of a Schrödinger type operator H with inner symmetries over a configuration space of the form K^n , where K is a totally disconnected, local field. To allow for inner symmetries the Hilbert space is of the form $L^2(K^n) \otimes \mathbb{C}^m$, and thus

H is a matrix-valued operator. We will also provide some background and motivation for doing physics over local fields.

10. Common Fixed point Theorems For Maps Under a Contractive Condition of Integral Type

A. DJOUDI AND F. MERGHADI UNIVERSIT DE ANNABA. ALGERIA

Abstract Two common fixed point theorems for mapping of complete metric space under a general contractive inequality of integral type and satisfying minimal commutativity conditions are proved. These results extend and improve several previous results particularly Theorem 4 of Rhoades [neuf] and Theorem 4 of Sessa [dix]. keywords: weakly compatible maps, common fixed point, contractive condition of integral type. 2000 Mathematics Subject Classification: 47H10. References [1] B. E. Rhoades, Two fixed point theorems for mappings satisfying a general contractive condition of integral type, Int. J. Math. Math. Sci. 63 (2003), 4007-4013. [2] S. Sessa, On a weak commutativity condition of mappings in fixed point considerations, Publ. Inst. Math. Beograd 32 (46) (1982), 149-153.

11. Réflexivité d'extensions d'opérateurs réflexifs par des opérateurs algébriques

OMAR EL-FALLAH

UNIVERSITÉ MOHAMMED V. RABAT. MOROCCO

Abstract. Soit T un opérateur linéaire borné sur un espace de Hilbert H . On note $Lat(T)$ le treillis des sous espaces fermés de H invariants par T , $AlgLat(T)$ l'algèbre des opérateurs bornés sur H tel que $Lat(T) \subset Lat(S)$ et $W(T)$ la fermeture (pour la topologie faible des opérateurs) des polynômes en T . On dit que T est réflexif si $AlgLat(T) = W(T)$. Dans cet exposé nous discuterons la réflexivité des extensions d'un opérateur réflexif par des opérateurs algébriques.

12. A Formula for the Haar measure on twisted locally compact quantum group

PIERRE FIMA (JOINT WORK WITH L. VAINERMAN)

UNIVERSITY FRANCHE COMTÉ. BESANCON. FRANCE

Abstract. The aim of this talk is to explain how to compute explicitly the Haar measure on a twisted locally compact quantum group. We will first recall the notion of locally compact quantum group. Then we will explain the idea of twisting and the formula for the twisted Haar measure. Finally we will give explicit examples : a one parameter deformation of the $az + b$ group.

13. On linear maps preserving generalized invertibility

YOUNESS HADDER (WITH NADIA BOUDI).
UNIVERSITY MOULAY ISMAIL, MEKNES

Abstract. Let A and B be unital Banach algebras. Let $a \in A$. If there exists $b \in A$ such that $aba = a$ and $bab = b$ then b is called a generalized inverse of a . A linear map $\phi : A \rightarrow B$ preserves generalized invertibility if $\phi(a)$ has a generalized inverse in B whenever a has a generalized inverse in A , and it preserves generalized invertibility in both directions if a has a generalized inverse in A if and only if $\phi(a)$ has a generalized inverse in B . Linear maps preserving generalized invertibility in both directions were first considered by Mbekhta, Rodman and Šemrl in the case where $A = B = B(H)$ is the algebra of bounded linear operators on an infinite dimensional Hilbert space H . In this talk we are concerned with linear maps preserving generalized invertibility in one direction. Some related problems (linear maps preserving Fredholm, or semi-Fredholm operators) are discussed.

This is joint work with Nadia Boudi (University of Meknes, Morocco).

14. On concrete spectral decomposition of L^2 -section over Complex Torus of dimension

AHMED INTISSAR
UNIVERSITY MOHEMMED V. RABAT

Abstract. In this talk, we consider an abelian variety of dimension n , that is an algebraic complex torus. Then as known there is a holomorphic line bundle such algebraic torus \mathbb{T} which can be endowed with an hermitian metric whose the holomorohic sections are called theta fonctions. But we will emphasis on a spectral decomposition of the space L^2 -thete fonctions though a second order elliptic differential operator whose the kerner is the holomorphictheta fonctions.

15. Hua operations and their eigenfunctions

KHALID KOUFANY (WITH WITH GENKAI ZHAN).
UNIVERSITÉ HENRI POINCARÉ-CNRS-INRIA, NANCY

We describe vector valued differential operators on a bounded symmetric domain $\Omega = G/K$, which characterizes the Poisson integrals $\mathcal{P}_s\varphi(z) = \int_{\mathcal{S}} P(z, u)^s \varphi(u) d\sigma(u)$ ($s \in \mathbb{C}$) on the Shilov boundary \mathcal{S} of Ω . For $s = 1$, this is a classical problem about harmonic functions, which has been considered in several papers (by Johnson and Korányi, Berline and Vergne, Lassalle ...). For tube-type domains Ω and generic s this problem has been solved by Shimeno. We establish new results on non-tube-type domains. It is shown for type one domains $SU(r, r + b)/S(U(r) \times U(r + b))$ that for generic s , a function f is the Poisson transform $\mathcal{P}_s\varphi$ for a hyperfunction φ on \mathcal{S} if and

only if $\mathcal{H}f = (r+b)^2s(s-1)fI_r$, where \mathcal{H} is a Hua-type second order differential operator with values in $M(r, \mathbb{C})$. General non-tube domains involves two Hua-type third-order differential operators.

16. On q -normal operators

ANNA KULA

JAGIELLONIAN UNIVERSITY. POLAND

ABSTRACT We study unital $*$ -algebras generated by families of q -normal operators, with some additional relations inside the family. These algebras constitute the framework for studying the notion of q -positivity that appeared in [A. Kula, *A q -analogue of complete monotonicity*, Colloq. Math. 111 (2008), 169-181]. Moreover, the distribution of sum of such operators, with respect to a given state, gives rise to a formula which can be interpreted as a new convolution of measures. This new convolution is related to the one defined by Carnevale and Koornwinder in [G. Carnovale, T.H. Koornwinder, *A q -analogue of convolution on the line*, Methods Appl. Anal. 7 (2000), 705-726]. We investigate positivity preserving properties for both convolutions. For the new one we find an appropriate analogue of the Fourier transform and also present a non-commutative analogue of the classical central limit theorem. This is a joint work with Éric Ricard.

17. Operator algebras and wavelet frames

DAVID R. LARSON

TEXAS A & M UNIVERSITY. USA

Abstract: We consider some problems in wavelet and frame theory from the point of view of operator algebras. Several years ago the speaker posed a problem concerning density of the set of wavelet frames. Bownik recently solved this problem, and we examine his result from the point of view of orthogonality of frames and certain operators we call Bessel multiplier operators. We obtain some new results using this approach, including a new proof of Bownik's density theorem.

18. Rademacher averages on noncommutative symmetric spaces

CHRITIAN LE MERDY

UNIVERSITY FRANCHE COMTE, BESANON, FRANCE

Abstract. Let E be a separable (or the dual of a separable) symmetric function space, let M be a semifinite von Neumann algebra and let $E(M)$ be the associated noncommutative function space. Let $(\varepsilon_k)_{k \geq 1}$ be a Rademacher sequence, on some probability space Ω . For finite sequences $(x_k)_{k \geq 1}$ of $E(M)$, we consider the Rademacher averages $\sum_k \varepsilon_k \otimes x_k$ as elements of the noncommutative function space $E(L^\infty(\Omega) \overline{\otimes} M)$ and study estimates for their norms $\|\sum_k \varepsilon_k \otimes x_k\|_E$ calculated in that space. Our aim is to establish Khintchine type inequalities in this context. In particular we show that if E is 2-concave, then $\|\sum_k \varepsilon_k \otimes x_k\|_E$ is equivalent to the infimum of

$\|(\sum y_k^* y_k)^{\frac{1}{2}}\| + \|(\sum z_k z_k^*)^{\frac{1}{2}}\|$ over all y_k, z_k in $E(M)$ such that $x_k = y_k + z_k$ for any $k \geq 1$. Dual estimates are given when E is 2-convex and has a non trivial upper Boyd index. In this case, $\|\sum_k \varepsilon_k \otimes x_k\|_E$ is equivalent to $\|(\sum x_k^* x_k)^{\frac{1}{2}}\| + \|(\sum x_k x_k^*)^{\frac{1}{2}}\|$. (Joint work with Fedor Sukochev.)

19. Meromorphic factorization and the kernel of a Toeplitz operator

MARIA TERESA MALHEIRO
UNIVERSITY OF MINHO. PORTUGAL

Abstract. If a Wiener-Hopf factorization for an invertible matrix G in $(C(R))^{n \times n}$ is known, then the dimension of the kernel and of the cokernel of the associated TG are explicitly given by the partial indices. This does not happen anymore when we have a meromorphic factorization $G = M^- M^+$ (1) where the factors M^- and M^+ do not satisfy the conditions for (1) to be a Wiener-Hopf factorization of G . The usual procedure to study the Toeplitz operator TG , in this case, involves obtaining a Wiener-Hopf factorization of G from the meromorphic one. Our aim is to show that from a meromorphic factorization of G we can obtain a complete characterization of the kernel of the Toeplitz operator TG directly, and obtain the partial indices, without actually determining a Wiener-Hopf factorization of the symbol. This is particularly useful to establish necessary and sufficient conditions for invertibility of TG . Moreover, knowing the partial indices beforehand, the procedure to transform a meromorphic factorization into a Wiener-Hopf one becomes easier and can be reduced to solving a linear system of equations.

This is a joint work with Cristina Cmara from Instituto Superior Tecnico, Lisbon, Portugal.

20. New results on linear preserving problems

MOSTAFA MBEKHTA
UNIVERSITY LILLE 1. FRANCE

Abstract. Let H be an infinite-dimensional complex separable Hilbert space and $\mathcal{B}(H)$ the algebra of all bounded linear operators on H . In this talk, we discuss the following new results:

Theorem I Let H be an infinite-dimensional separable Hilbert space and $\phi : \mathcal{B}(H) \rightarrow \mathcal{B}(H)$ a linear map preserving generalized invertibility in both directions. Assume that ϕ is surjective up to finite rank operators. Then

$$\phi(\mathcal{B}(H)) \subseteq \mathcal{K}(H)$$

and there exist an invertible element $\mathbf{a} \in \mathcal{B}(H)$ and either an automorphism $\tau : \mathcal{C}(H) \rightarrow \mathcal{C}(H)$ or an anti-automorphism $\tau : \mathcal{C}(H) \rightarrow \mathcal{C}(H)$ such that the induced map $\varphi : \mathcal{C}(H) \rightarrow \mathcal{C}(H)$, $\varphi(A + \mathcal{K}(H)) = \phi(A) + \mathcal{K}(H)$, $A \in \mathcal{B}(H)$, is of the form

$$\varphi(\mathbf{x}) = \mathbf{a}\tau(\mathbf{x}), \quad \mathbf{x} \in \mathcal{C}(H).$$

Theorem II Let H be an infinite-dimensional separable Hilbert space and $\phi : \mathcal{B}(H) \rightarrow \mathcal{B}(H)$ a linear map preserving semi-Fredholm operators in both directions. Assume that ϕ is surjective up to compact operators. Then

$$\phi(\mathcal{K}(H)) \subseteq \mathcal{K}(H)$$

and the induced map $\varphi : \mathcal{C}(H) \rightarrow \mathcal{C}(H)$ is either an automorphism, or an anti-automorphism multiplied by an invertible element $\mathbf{a} \in \mathcal{C}(H)$.

Theorem III Under the same hypothesis and notation as in (II), the following statements hold true:

- (i) ϕ preserves Fredholm operators in both directions;
- (ii) there is an $n \in \mathbb{Z}$ such that either

$$\text{ind}(\phi(T)) = n + \text{ind}(T) \quad \text{or} \quad \text{ind}(\phi(T)) = n - \text{ind}(T)$$

for every Fredholm operator T ,

Observe that, every $n \times n$ complex matrix has a generalized inverse (resp. is semi-Fredholm, Fredholm), and therefore, every linear map on a matrix algebra preserves generalized invertibility (resp. semi-Fredholm, Fredholm) in both directions. So, we have here an example of a linear preserver problem which makes sense only in the infinite-dimensional case.

REFERENCES

- [1] B. Aupetit, *Sur les transformations qui conservent le spectre*, Banach Algebra'97 (Walter de Gruyter, Berlin), (1998), 55-78.
- [2] B. Aupetit, *Spectrum-preserving linear mappings between Banach algebras or Jordan-Banach algebras*, J. London Math. Soc. **62** (2000), 917-924.
- [3] M. Mbekhta, L. Rodman, and P. Šemrl, *Linear maps preserving generalized invertibility*, Int. Equ. Op. Th. **55** (2006), 93-109.
- [4] M. Mbekhta, *Linear maps preserving a set of Fredholm operators*, Proc. Amer. Math. Soc. **135** (2007) 3613-3619.
- [5] M. Mbekhta and P. Šemrl, *Linear maps preserving semi-Fredholm operators and generalized invertibility*, Linear and Multilinear Algebra, (to appear).
- [6] A.R. Sourour, *Invertibility preserving linear maps on $L(X)$* , Trans. Amer. Math. Soc. **348** (1996), 13-30.

21. Algèbre et représentation des observables dans la description des systèmes statistiques quantiques.

M. T. MEFTA, AND F.Z. ZOUARI
UNIVERSITY DE OUARGLA ALGÉRIA

abstract. On s'intéresse à étudier les propriétés thermodynamiques des systèmes statistiques quantiques en se servant des algèbres et des états de Weyl

22. Weak*-closed Jordan ideals of nest algebras

LINA OLIVEIRA

INSTITUTO SUPERIOR TECNICO. LISBOA. PORTUGAL

Abstract The holomorphic structure of the open unit ball in any nest algebra A of bounded linear operators on a complex Hilbert space leads to the existence of a closed subspace A_s of A , known as the symmetric part of A , and of a partial triple product $(a; b; c)$ mapping $A_s A_s A$ to A . The existence of a Jordan triple identity satisfied by this algebraic structure relates the nest algebra A to the Banach Jordan triple systems important in infinite-dimensional holomorphy. The ideals of nest algebras related to its associative multiplication have been extensively investigated, and whilst it is clear that ideals in the associative sense provide examples of ideals in the partial triple sense, the converse assertion remains in general an open problem. It is the aim of this talk to show that, in a large class of nest algebras, the weak*-closed ideals in the partial triple sense are also weak*-closed ideals in the associative algebra sense. Reference Lina Oliveira, Weak*-closed Jordan ideals of nest algebras, Math. Nachr., 248/249, 2003, 129143

23. Purely infinite corona algebras of simple stable C*-algebras

FRANCESC PERERA

UNIVERSITY OF BARCELONA. SPAIN

Abstract. In this talk I will discuss conditions under which corona algebras of simple, stable C*-algebras with some form of comparison are purely infinite (not simple). This is joint work in progress with Dan Kucerovsky and Ping Wong Ng.

24. C*-algebras irreps from interval maps

PAULO PINTO

INSTITUTO SUPERIOR TECNICO OF LISBOA, PORTUGAL

Abstract. If $f : I \rightarrow I$ is a Markov and expansive interval map, A_f its transition (finite) 0-1-matrix and $x \in I$, we construct a unitary representation of the Cuntz-Krieger \mathcal{O}_{A_f} algebra. We show that each orbit encodes an equivalence class of an \mathcal{O}_{A_f} irrep. For A_f full $a_{ij} = 1$, we obtain Bratteli and Jorgensen permutative Cuntz \mathcal{O}_n algebra reps. We further analyse C*-representations arising from the families: $f(x) = \beta x + \alpha \pmod{1}$ and quadratics $f(x) = 4bx(1-x)$. (joint with Carlos C Ramos, N Martins, J Sousa Ramos)

25. The lattice of invariant subspaces of a class of composition operators

MANUEL PONCE-ESCUADERO

UNIVERSITY OF SEVILLA.

Abstract. It is well known that the lattice of invariant subspaces of the operator of multiplication by a cyclic element of a Banach algebra consists of the closed ideals of this algebra. This result is used to find the lattice of invariant subspaces of composition operators C_φ acting on the Hardy space and whose inducing symbol φ is a parabolic non-automorphism self-map of the unit disk.

The family of inner functions $e_t(z) = \exp\left(t\frac{z+1}{z-1}\right)$, where $t > 0$, is the set of eigenfunctions of C_φ . Thus,

$$\text{Lat } C_\varphi = \left\{ \overline{\text{span}} \{e_t : t \in F\} : F \in \mathbb{F}[0, \infty) \right\},$$

where $\mathbb{F}[0, \infty)$ is the set of closed subsets of $[0, \infty)$. In particular, each invariant subspace always consists of the closed span of a set of eigenfunctions of the composition operator.

This is a joint work with Alfonso Montes-Rodríguez and Stanislav A. Shkarin.

26. Markov dilation for Schur Multipliers

ERIC RICARD

UNIVERSITY FRANCHE COMTÉ. FRANCE

Abstract. A Markov map u is a completely positive map between two von Neumann algebra which respects some states (intertwines their modular groups). Such a map u is said to be factorisable if it can be written $u = E \circ i$, where i is a representation and E is a conditional expectation with the additional property that they are also Markov map. This is a strengthening of the classical Stinespring dilation. We study this notion for various kind of multipliers.

27. Orbits of operators commuting with the Volterra operator.

ALFONSO MONTES RODRIGUEZ

UNIVERSITY SEVILLA

Abstract. Asymptotic estimates of the norms of orbits of certain operators that commute with the classical Volterra operator V acting on $L^p[0, 1]$, with $1 \leq p \leq \infty$, are obtained. The results apply not only to the Riemann–Liouville operator V^r and to $I + V^r$ with $r > 0$, but also to operators of the form $\phi(V)$, where ϕ is a holomorphic function at zero. The method to obtain the estimates is based on the fact that the Riemann–Liouville operator as well as the Volterra operator can be related to the Levin–Pfluger theory of holomorphic functions of completely regular growth. Different methods, such as the Denjoy–Carleman Theorem, are needed to analyze the behavior of the orbits of $I - cV$, where $c > 0$. The results are applied to the study of cyclic properties of $\phi(V)$, where ϕ is a holomorphic function at 0.

28. Normals, subnormals and their q -counterparts

FRANCISZEK SZAFRANIEC,
JAGIELLONIAN UNIVERSITY. POLAND.

Abstract. The talk is intended to be a survey of the theory of *unbounded* subnormal operators as well as an introduction to that of their q -versions. As such it is directed towards a broad audience interested in operator theory.

29. Operator Multipliers

IVAN G. TODOROV
QUEEN'S UNIVERSITY BELFAST. UNITED KINGDOM

Abstract. The purpose of this talk is to present some recent results concerning a non-commutative version of the classical notion of Schur multipliers called operator multipliers. We will give a characterisation of operator multipliers which parallels the classical description by Grothendieck and its generalisation by Peller and Spronk. The compactness properties of operator multipliers will be discussed and a characterisation of the completely compact operator multipliers will be provided. A multidimensional version of operator multipliers will be presented.

The talk will be centred around a joint work with K. Juschenko, R. Levene and L. Turowska.

30. Completely 1-summing maps between some homogeneous Hilbertian operator spaces

QUANHUA XU
UNIVERSITY FRANCHE COMTÉ

Abstract. We discuss in this talk completely 1-summing maps between two homogenous spaces E and F that are quotients of subspaces of $C \oplus R$, where C and R are the column and row operator spaces. We show that the associated space $\Pi_1^q(E, F)$ coincides with a Schatten-Orlicz class. We determine explicitly the underlying Orlicz function when E and F are two column p -spaces. This is a joint work with Marius Junge.

31. NON-COMMUTATIVE INDEPENDENCE OF ALGEBRAS AND APPLICATIONS TO PROBABILITY

Janusz Wysoczanski
Wroclaw University, Poland

Abstract. We discuss various notions of non-commutative independence for algebras. This includes free, boolean and monotonic independence. We exhibit examples of basic constructions related to these notions. Then we shall discuss non-commutative probabilistic aspects of these independence notions, showing examples of central limit theorems. Finally, the notion of bm -independence will be discussed, which is a generalization of both

monotonic and boolean independence. Example of bm-independent algebras will be given. We shall show how it can be related with symmetric (and non-symmetric) positive cones, and what measures are obtained in the related central limit theorem. Combinatorial aspects of this constructions will be also discussed.

32. Spectral invariance for commuting n -tuples

EL HASSAN ZEROUALI WITH CHAFIQ BENHIDA
UNIVERSITY MOHEMMED V.

Abstract. We investigate in this talk spectral relations between the commuting n -tuples RS and SR under some commutativity conditions. A number of result is given either in the global spectral setting or the local spectral setting.

33. Shrödinger operator on the quaternionic field

A. ZINOUN
UNIVERSITÉ DES SCIENCES ET TECHNOLOGIES DE LILLE, FRANCE

Abstract. The Shrödinger operator on the quaternionic field is a differential operator $\mathbb{L}_{\vec{\varepsilon}, \vec{\nu}}$ acting on $C^\infty(\mathbb{R}^4; \mathbb{C})$, defined as the Fourier transform of the sub-Laplacian associated to the quaternionic Heisenberg group $\mathbb{R}^3 \times \mathbb{R}^3 \times_\omega \mathbb{R}^4$, where \mathbb{R}^4 is viewed as the space of quaternions \mathbb{H} , ω is a canonical $\mathbb{R}^3 \times \mathbb{R}^3$ -valued symplectic form on \mathbb{H} and $\vec{\varepsilon}, \vec{\nu} \in \mathbb{R}^3$ are fixed. $\mathbb{L}_{\vec{\varepsilon}, \vec{\nu}}$ is proportional to the Hamiltonian of a charged particle in \mathbb{R}^4 , interacting with a uniform electromagnetic field $\vec{\varepsilon}, \vec{\nu}$. By a suitable orthogonal change of basis in \mathbb{R}^4 , $\mathbb{L}_{\vec{\varepsilon}, \vec{\nu}}$ transforms into a Shrödinger operator $\mathbb{L}_{\xi_1, \xi_2}$, ξ_1 and ξ_2 are scalars and characterize the Hamiltonian of two superposed coupled complex harmonic oscillators. The spectral theory of $\mathbb{L}_{\xi_1, \xi_2}$, appears simpler than the $L_{\vec{\varepsilon}, \vec{\nu}}$ one.