Oren Becker, Cambridge University

Stability in permutations

Let Γ be a finitely generated group. We shall discuss the question: Is Γ stable in permutations? In other words, is every approximate homomorphism from Γ to a symmetric group obtained by a small deformation of a true homomorphism? I plan to present a characterization of stability among amenable groups in terms of invariant random subgroups, and the recent applications of this characterization for proving the stability of various interesting groups.

Time permitting, we shall discuss stability in the context of Kazhdan groups, the relations to sofic groups, and quantitative stability.

The talk is based on joint works with Alex Lubotzky, Andreas Thom and Jonathan Mosheiff.

Søren Eilers, University of Copenhagen

(Weak) semiprojectivity of group C^*-algebras

The notions of semiprojectivity and weak semiprojectivity are standard tools in the classification and structure theory C^*-algebra. These notions specialized to group C^*-algebras give a way to address stability properties (in operator norm) of unitary representations of the groups in question. One class of special interest are the wallpaper groups, in which we can show that 12 are weakly semiprojective and 5 are not. This difference is explained via orderd K-theory.

Joint work with Tatiana Shulman and Adam Sørensen.

Lev Glebsky, Universidad Autónoma de San Luis Potosí

Residually-finite-by-residually-finite extensions are weakly sofic

I plan to discuss the result of the title and some related results (not necessarily ones by the speaker). My proof of the statement "residually-finite-by-residually-finite extensions are weakly sofic" is based on characterization of weakly sofic groups by solvability of equations over groups. I plan to discuss relations of equations on and over groups with soficity in some details.

Izhar Oppenheim, Ben-Gurion University

Stability of groups acting on buildings

Abstract: In a fairly recent work, De Chiffre, Glebsky, Lubotzky and Thom showed that a group acting cocompactly and properly on an affine building is stable with respect to the class of unitary matrices with the Frobenius norm (assuming that the building is of dimension larger than 2 and has large enough thickness).

In my talk I will explain how to generalize this result to the setting of p-norms on unitary matrices where $1 < p < \infty$.

This talk is based on a joint work with Alex Lubotzky.

Liviu Paunescu, The Romanian Academy

Krein-Milman for the space of sofic representations

Following ideas of Nate Brown, the space of sofic representations of a countable group, up to conjugation, is shown to have a convex structure. For a sofic, non-amenable group, this space is not compact, as shown by Taka Ozawa. In this talk we discuss the difficulties of proving a Krein-Milman result for this space, in the lack of compactness. Joint work with Radu Munteanu.

Mikael Rørdam, University of Copenhagen

Almost commuting matrices - now and then

I will review the proof of Peter Friis and myself of the theorem of Huaxin Lin that almost commuting self-adjoint matrices are close to exactly commuting self-adjoint matrices, and I will also discuss the context of this problem. Various possible - and impossible - generalizations of this theorem will also be reviewed, and some more recent improvements of Lin's theorem, in different directions, in particular the Filonov-Safarov theorem (JAMS, 2010) and the much more recent Enders-Shulman result (arXiv 2019) will be mentioned.

Tatiana Shulman, IMPAN

Hilbert-Schmidt stability for C^*-algebras and groups

We will discuss Hilbert-Schmidt stability for C^*-algebras and groups. We also will consider certain modifications of Hilbert-Schmidt stability e.g. when matrices are replaced by elements of von Neumann II_1-factors as well as a relation between Hilbert-Schmidt stability and operator norm-stability. Joint work with Don Hadwin.

Hannes Thiel, WWU Münster

Rigidity results for L_p-operator algebras

An L_p-operator algebra is a Banach algebra that admits an isometric representation on some L_p-space ($p \neq 2$). Given such an algebra A, we show that it contains a unique maximal sub-C^*-algebra, which we call its C^*-core. The C^*-core is automatically abelian, and its spectrum is naturally equipped with an inverse semigroup of partial homeomorphisms. We call the associated groupoid of germs the Weyl groupoid of A.

The Weyl groupoid contains information about the internal dynamics of the algebra A, and in some some cases it is a complete invariant. For example, given a topologically free action on a compact space, the Weyl groupoid of the reduced L_p-crossed product is simply the transformation groupoid of the action. This leads to strong rigidity results for reduced groupoid algebras and reduced crossed products.

We use our results to answer a question of Phillips: The L_p-analog of the Cuntz algebra O_2 is not isomorphic to its tensor square.

Joint work with Yemon Choi and Eusebio Gardella.

BONUS TALK

David Roberson, Danish Technical University

Quantum isomorphism is equivalent to equality of homomorphism counts from planar graphs

Over 50 years ago, Lovász proved that two graphs are isomorphic if and only if they admit the same number of homomorphisms from any graph [Acta Math. Hungar. 18 (1967), pp. 321–328]. In this work we prove that two graphs are quantum isomorphic (in the commuting operator framework) if and only if they admit the same number of homomorphisms from any planar graph. As there exist pairs of non-isomorphic graphs that are quantum isomorphic, this implies that homomorphism counts from planar graphs do not determine a graph up to isomorphism. Another immediate consequence is that determining whether there exists some planar graph that has a different number of homomorphisms to two given graphs is an undecidable problem, since quantum isomorphism is known to be undecidable. Our characterization of quantum isomorphism is proven via a combinatorial characterization of the intertwiner spaces of the quantum automorphism group of a graph based on counting homomorphisms from planar graphs. This result inspires the definition of ”graph categories” which are analogous to, and a generalization of, partition categories that are the basis of the definition of easy quantum groups. Thus we introduce a new class of ”graph-theoretic quantum groups” whose intertwiner spaces are spanned by maps associated to (bi-labeled) graphs.

Joint with Laura Mancinska.