IMU2023
Operator Algebras Session

September 3, 2023

Schedule

14:00 - 14:30	**Orr Shalit** Technion	Algebras of bounded analytic noncommutative functions
14:40 - 15:10	**Eli Glasner** TAU	On the existence, or lack, of non-commutative factors of a dynamical system
15:20 - 15:50	**Uri Bader** WIS	Non commutative ergodic theory, SAT actions and application to factor theorems
15:50 - 16:10	**Coffee**	
16:10 - 16:40	**Yair Hartman** BGU	On subalgebras of LG
16:50 - 17:20	**Daniel Markiewicz** BGU	Symmetries of quantum dynamical semigroups of $B(H)$

Titles and Abstracts

Algebras of bounded analytic noncommutative functions

Orr Shalit (Technion)

What are noncommutative functions?
What kind of operator algebras do they give rise to?
Why are we asking this question?
What did we learn?
What's next?
This talk — inspired by a recent work in progress with Jeet Sampat — will be an attempt to answer the above questions.

On the existence, or lack, of non-commutative factors of a dynamical system

Eli Glasner (TAU)

Given a dynamical system (X, Γ) we say that the corresponding crossed product C^*-algebra $C(X) \rtimes_r \Gamma$ is reflecting, when every intermediate C^*-algebra $C_r^*(\Gamma) < \mathcal{A} < C(X) \rtimes_r \Gamma$, which we consider as a "non-commutative factor", is of the form $\mathcal{A} = C(Y) \rtimes_r \Gamma$, corresponding to a dynamical factor $X \to Y$. We establish (dynamical) sufficient conditions on (X, Γ) under which $C(X) \rtimes_r \Gamma$ is reflecting, and provide several examples where these sufficient conditions apply. It turns out that when our conditions are satisfied the acting group Γ is necessarily C^*-simple. In the second part of the talk I will examine the opposite part of the story, when Γ is not C^*-simple.

This talk is based on two recent joint works with Tattwamasi Amrutam and Yair Glasner.

Non commutative ergodic theory, SAT actions and application to factor theorems

Uri Bader (WIS)

I will discuss notions of non-commutative ergodicity. The most naive definition concerns a group action on a von Neumann algebra endowed with an invariant (normal, faithful) state. A natural generalization is obtained when replacing the invariant state with an equivariant ucp map. Furstenberg's boundary theory provides a most natural example of this setting. In particular, it is related to the SAT property, which I will define and discuss. After surveying some ergodicity results for SAT actions, I will explain our source of motivation for this study: non-commutative factor theorems a la Margulis.

The lecture is based on a joint work with Guy Salomon.

On subalgebras of LG

Yair Hartman (BGU)

Inspired by the Chabouty space of subgroups from geometric group theory, we study the space of subalgebras of the group von Neumann algebra of a countable discrete group (which extends the Chabouty space). We present some results regarding amenable subalgebras and rigid situations where all the invariant sub-algebras come from normal subgroups.

Joint work with Tattwamasi Amrutam and Hanna Oppelmayer

Symmetries of quantum dynamical semigroups of $B(H)$

Daniel Markiewicz (BGU)

In this talk we are interested in quantum dynamical semigroups of $B(H)$ and their symmetries. Those are the weak* continuous one-parameter semigroups of completely positive unital maps of the algebra of bounded operators on a Hilbert space H. We will also be interested in the semigroups of endomorphisms which they generate by Bhat dilation (known as E_0-semigroups). We will discuss some work in progress on the symmetries of these semigroups, especially for some tensor products. By symmetries of a quantum dynamical semigroup we mean the group of cocycle self-conjugacies of the minimal Bhat dilation.

N.B. These semigroups are called quantum dynamical because they form a model for the time evolution of Markovian open quantum systems. However we will be focused on issues in pure mathematics, and we will stay away from physics or quantum computation in this talk.