Swedish OA & NCG meeting in Stockholm – Spring 2023

Guillaume Bellier (Chalmers/University of Gothenburg)

Title: Semi projectivity of soft C*-algebras: the P2 case

Abstract: In order to study the possible decomposition of a C*algebra as a direct limit of semi-projective C*-algebras, the softening of a C*-algebra has been considered. In this context, we present the non semi-projectivity of the soft P2 algebra.

Ulrik Enstad (Stockholm University)

Title: Completeness of lattice orbits of discrete series representations

Abstract: Given an irreducible, unitary representation π of a locally compact group G, when does the restriction of π to a given lattice in G admit a cyclic vector? This problem, along with its many variations, has applications in signal processing, and can be approached using techniques from both von Neumann algebras and C*-algebras. My talk will be an introduction to this topic and its state of the art.

Magnus Goffeng (Lund)

Title: Toeplitz operators on Carnot manifolds

Abstract: In this talk I will discuss Toeplitz operators on Carnot manifolds. Classically, a Toeplitz operator is obtained from compressing multiplication operators on an L^2-space to a space of functions that are holomorphic or admit a holomorphic extension to a filling complex manifold. The notion of Toeplitz operators makes sense in a larger generality, and the case of Carnot manifolds provides interesting examples. In the talk, we focus on an example arising on the quaternionic sphere where we can construct Toeplitz operators from the representation theory of the quaternionic Heisenberg group. In analogy with the realization of the holomorphic discrete series representations of SU(n,1) on the Hardy space on S^{2n-1}, we expect these Toeplitz operators to arise from discrete series representations of Sp(n,1).

Felix Parraud (KTH)

Title: Interpolation between random matrices and free operators

Abstract: Recently, we developed a strategy to interpolate random matrices with their deterministic limit with the help of free stochastic calculus. I will start by introducing the problems that this method was first designed to solve, notably the question of strong convergence of a family of random matrices. Indeed if one considers a polynomial in those random matrices, one can wonder how the spectrum of the resulting matrix behaves when the dimension goes to infinity. In particular, a recurring question is whether the operator norm converges. Then I will explain how to use this tool to compute some highly non trivial quantities in Random Matrix Theory. We will study the case of GUE as well as Haar unitary random matrices.

Hannes Thiel (Chalmers / University of Gothenburg)

Title: Traces on ultrapowers of C*-algebras

Abstract: Every sequence of traces on a C*-algebra A induces a limit trace on a free ultrapower of A. Using Cuntz semigroup techniques, we characterize when these limit traces are dense. Quite unexpectedly, we obtain as an application that every simple C*-algebra that is (m,n)-pure in the sense of Winter is already pure.

This is joint work with Antoine, Perera and Robert.

Anitha Thillaisundaram (Lund University)

Title: The Hausdorff dimensions of branch groups

Abstract: The concept of Hausdorff dimension was defined in the 1930s and was originally applied to fractals and shapes in nature. However, from the work of Abercrombie, Barnea and Shalev in the 1990s, the computation of the Hausdorff dimensions in profinite groups has been made possible. Starting with Abert and Virag's well-known result that there are groups acting on a rooted tree with all possible Hausdorff dimensions, mathematicians have been interested in computing the Hausdorff dimensions of explicit families of groups acting on rooted trees, and in particular, of the so-called branch groups. Branch groups first appeared in the context of the Burnside problem, where they delivered the first explicit examples of finitely generated infinite torsion groups. Since then, branch groups have gone on to play a key role in group theory and beyond. In particular, Steinberg and Szakacs have recently given necessary and sufficient conditions for the Nekrashevych algebra of certain branch groups to be simple. In this talk, we will survey known results concerning the Hausdorff dimensions of branch groups, in particular mentioning some recent joint work Gustavo Fernandez-Alcober and Sukran Gul.