Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

April 28 Itamar Vigdorovich, UCSD

Title: The trace simplex of free products

We study the space of traces associated with arbitrary (full) free products of unital, separable C^* -algebras. We show that, unless certain basic obstructions (which we fully characterize) occur, the space of traces always results in the same object: the Poulsen simplex, that is, the unique infinite-dimensional metrizable Choquet simplex whose extreme points are dense. Moreover, in such cases the extreme points are dense in the Wasserstein topology. Concretely for the case of groups, we find that, unless the trivial character is isolated in the space of characters, the space of traces of a free product of groups is the Poulsen simplex. Our main technical contribution is a new perturbation result for pairs of von Neumann subalgebras (M_1, M_2) of a tracial von Neumann algebra M, providing necessary conditions under which M_1 and a small unitary perturbation of M_2 generate a Π_1 factor. This is a joint work with Ioana and Spaas: https://arxiv.org/pdf/2407.15985