

Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

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Title: *Berry-Esseen Bounds for Operator-valued Free Limit Theorems*

The development of free probability theory has drawn much from the deep and far reaching analogy with classical probability theory. The same holds for the operator-valued extension, where the fundamental notion of free independence is generalized to free independence with amalgamation as a kind of conditional version of the former. Its development naturally led to free analogues of key and fundamental limiting theorems such as the operator-valued free Central Limiting Theorem due to Voiculescu and the asymptotic distributions of matrices with operator-valued entries. In this talk, we show Berry-Esseen bounds for such limit theorems. The estimates are on the level of operator-valued Cauchy transforms and the Levy distance. We address also the multivariate setting for which we consider linear matrix pencils and noncommutative polynomials as test functions. The estimates are in terms of operator-valued moments and yield the first quantitative bounds on the Levy distance for the operator-valued free CLT. This also yields quantitative estimates on joint noncommutative distributions of operator-valued matrices having a general covariance profile. This is joint work with Tobias Mai.