

Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

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Title: *Free probability and polynomial roots under repeated differentiation*

Recently a (growing) number of papers have described a surprising connection between differentiation of polynomials and certain sums of random matrices. This connection allows one to use free probability to describe the flow of polynomial roots under differentiation. So far, this work has focused primarily on polynomials with real roots, where the related operators are self-adjoint and the free additive convolution is well studied. We will briefly discuss the modern history of polynomial differentiation, the recent success of finite free probability in random polynomials, and progress on extending these connections to polynomials with complex roots. We will specifically focus on random polynomials with independent coefficients and their connections to R-diagonal operators. With a free probabilistic interpretation in hand we will consider natural questions of stability and central limit behavior in the long time limit of the differentiation flow. Based on joint work with Sean O'Rourke and David Renfrew.