Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

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Title: *Spectral stability under random absolutely continuous perturbations*

Both the set of non-diagonalizable matrices and the set of matrices with repeated eigenvalues have measure zero. Hence, if one adds independent random variables with absolutely continuous distributions to each entry of an arbitrary matrix, the resulting matrix will be diagonalizable and will have distinct eigenvalues almost surely. In this talk I will present a quantitative version of this statement: with high probability, adding a small absolutely continuous real perturbation to an arbitrary matrix with real entries makes its eigenvector condition number at most polynomial in the dimension of the matrix. The same perturbation induces eigenvalue distances that are at least a polynomial of the inverse dimension of the matrix. These phenomena have previously been proved when the entries of the random perturbation are independent complex Gaussians. I will discuss the intricacies that arise when proving an analogous statement in the general setting of a real absolutely continuous random perturbation with independent entries, and sketch the ideas used to resolve these problems. This is joint work with Jess Banks, Archit Kulkarni and Nikhil Srivastava arXiv:2005.08930.