UTRGV

School of Mathematical and Statistical Sciences

Colloquium Series

Asymptotic gap distributions of the Gaussian unitary and Jacobi unitary ensembles

Dr. Yang Chen University of Macau

<u>Abstract</u>

Abstract: In this talk, we address a class of problems in unitary ensembles. Specifically, we study the probability that a gap symmetric about 0, i.e., (-a, a) and the Jacobi Unitary Ensembles (JUE) (where, in the JUE, we take the parameters, $\alpha = \beta$). By exploiting even parity of the weights, a doubling of the interval to (a^2, ∞) for GUE, $(a^2, 1)$, for the symmetric JUE, shows that the gap probability may be determined as the product of the smallest eigenvalue distributions of the Laguerre Unitary Ensemble (LUE) with paramter $\alpha = -1/2$, and $\alpha = 1/2$ and the (shifted) JUE with weights $x^{1/2}(1-x)^{\beta}$ and $x^{-1/2}(1-x)^{\beta}$.

The σ function, namely, the derivative of the log of the smallest eigenvalue distributions of the finite *n*-LUE and JUE satisfies the Jimbo-Miwa-Okamoto σ form of PV and PVI, although in the shifted Jacobi case, with the weight $x^{\alpha}(1-x)^{\beta}$, the β parameter does not show up in the equation. We also obtain the asymptotic expansions for the smallest eigenvalues distribution of the LUE and JUE, after appropriate double scaling, obtained the constants in the asymptotic expansion of gap probability, expressed in terms of the Barnes *G*-function, evaluated at special points.

Date: Friday, April 1, 2022

Time: 9:00-10:00 am CT

Zoom: https://utrgv.zoom.us/j/83952552265

For further information or for special accommodations, please contact Dr. Alexey Glazyrin via email alexey.glazyrin@utrgv.edu and Dr. Zhijun Qiao via email zhijun.qiao@utrgv.edu