

## On the asymptotic analysis of bordered Toeplitz determinants

*Tuesday, September 15, 2020 5:40 PM (50 minutes)*

Starting from the seminal works of Szegő, Kaufman and Onsager, on the diagonal and row correlations in the Ising model, the Toeplitz determinants have been playing a very important role in many areas of analysis and mathematical physics. A growing interest has been recently developed to the study of certain generalizations of Toeplitz determinants. One of these generalizations, the so called "bordered Toeplitz determinants" is the topic of this talk.

For the first time, the bordered Toeplitz determinants appeared in 1987 work of Au-Yang and Perk where it was shown that the Ising next-to-diagonal correlation functions are described by a bordered Toeplitz determinant. The analysis of this determinant had been continued in 2007 paper of Witte where an important fact - the relation of the bordered Toeplitz determinant of Au-Yang and Perk to the orthogonal polynomials on the circle, had been established. This, in particular, had opened a possibility to use the Riemann-Hilbert method for the analysis of the bordered determinants. However, the asymptotic results similar to the classical Szegő and Fisher-Hartwig asymptotic theory of "pure" Toeplitz determinants have not yet been known.

In this talk, a counterpart of the Strong Szegő theorem for a wide class of the bordered Toeplitz determinants will be presented and discussed. This is a joint project with Estelle Basor, Torsten Ehrhardt, Roozbeh Gharakhloo, and Yuqi Li. In our analysis we use the two complementary approaches - the Riemann-Hilbert and the Operators methods. In the talk, the emphasis will be made on the Riemann-Hilbert technique as directly connected to the Integrable systems which is the topic of the conference.

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