

Double-scaling asymptotics for Toeplitz determinants

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We shall review some results and open questions on double-scaling asymptotics for Toeplitz determinants. We briefly discuss the transitions between (1) the asymptotic regime for a smooth nonzero symbol and the one for a symbol with one Fisher-Hartwig singularity, i.e., the emergence of a singularity; (2) the merging of 2 singularities into one; (3) the closing of the arc where the symbol is zero.

Applications of these asymptotics in 2 dimensional Ising model, in random matrices, and beyond will be mentioned.

The talk will be based on joint works with Tom Claeys, Percy Deift, Alexander Its.