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Measures on partitions, Pfaffian point processes, and the matrix hypergeometric kernel

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Abstract

Integrable ensembles of random matrix theory can be divided into three symmetry types: unitary, orthogonal, and symplectic. The first symmetry type leads to determinantal point processes, the ensembles of orthogonal and symplectic symmetry types define the Pfaffian point processes.

It was discovered by Alexei Borodin and Grigori Olshanski that the determinantal point processes of random matrix type emerge in the harmonic analysis on the infinite symmetric group: these point processes are defined by the z-measures on the one-dimensional lattice. The question arises wether Pfaffian processes of random matrix type also emerge in the context of big groups.

In the present work we study the Pfaffian point processes originated from the representation theory of the infinite symmetric group. Such processes are defined by the deformed z-measures with the Jack parameters 2, 1/2. We solve the problem of computation of the correlation function, and establish connection with orthogonal and symplectic ensembles of random matrix theory. Our main result is the expression of the matrix correlation kernel for such z-measures in terms of the Gauss hypergeometric functions.