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The shifted Schur process and generalized MacMahon’s formula

Mirjana Vuletic
Department of Mathematics
Caltech University
Pasadena, CA 91125
USA

vuletic@caltech.edu

Abstract

We introduce a measure on strict plane partitions that is an analog of the uniform measure on plane partitions. We describe this measure in terms of a Pfaffian point process and compute its bulk limit when partitions become large.

The above measure is a special case of the shifted Schur process, which generalizes the shifted Schur measure introduced by Tracy and Widom and is an analog of the Schur process introduced by Okounkov and Reshetikhin. We use the Fock space formalism to prove that the shifted Schur process is a Pfaffian point process and calculate its correlation kernel.

We also obtain a generalization of MacMahon’s formula for the generating function of plane partitions. We give a 2-parameter generalization related to Macdonald’s symmetric functions. The formula is especially simple in the Hall–Littlewood case.