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**International Centre
for Theoretical Physics**



Tomohiro SASAMOTO
Tokyo Institute of Technology
Japan

Spin current for the quantum 1D XX spin chain and the Bessel kernel

Abstract

We consider the current statistics of the quantum XX spin chain on \mathbb{Z} , starting with the domain wall initial condition. We will show that the Laplace transform of the integrated current of up-spins at the origin between time 0 and t is written in terms of the Bessel kernel, which has been known to describe statistics of eigenvalues at the “hard edge” of the Wishart random matrix ensemble.

By performing asymptotics, we give an explicit formula for the large deviation in terms of elliptic integrals and discuss connections to previous works on average and variance.

Reference:

H. Moriya, R. Nagao, and T. Sasamoto, arXiv: 1901.07228