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Determinantal processes with number variance saturation. (English) Zbl 1112.82036

Summary: Consider Dyson’s Hermitian Brownian motion model after a finite time $S$, where the process is started at $N$ equidistant points on the real line. These $N$ points after time $S$ form a determinantal process and has a limit as $N \to \infty$. This limiting determinantal process has the interesting feature that it shows number variance saturation. The variance of the number of particles in an interval converges to a limiting value as the length of the interval goes to infinity. Number variance saturation is also seen for example in the zeros of the Riemann $\zeta$-function. The process can also be constructed using non-intersecting paths and we consider several variants of this construction. One construction leads to a model which shows a transition from a non-universal behaviour with number variance saturation to a universal sine-kernel behaviour as we go up the line.

MSC:
82C41 Dynamics of random walks, random surfaces, lattice animals, etc. in time-dependent statistical mechanics
60J65 Brownian motion
11Z05 Miscellaneous applications of number theory
11M26 Nonreal zeros of $\zeta(s)$ and $L(s, \chi)$; Riemann and other hypotheses

Full Text: DOI arXiv

References:


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