Mathematical Physics

Eigenvalue distributions from a star product approach

J. N. Kriel, F. G. Scholtz

(Submitted on 5 Jun 2012)

We use the well-known isomorphism between operator algebras and function spaces equipped with a star product to study the asymptotic properties of certain matrix sequences in which the matrix dimension D tends to infinity. Our approach is based on the $su(2)$ coherent states which allow for a systematic 1/D expansion of the star product. This produces a trace formula for functions of the matrix sequence elements in the large-D limit which includes higher order (finite-D) corrections. From this a variety of analytic results pertaining to the asymptotic properties of the density of states, eigenstates and expectation values associated with the matrix sequence follows. It is shown how new and existing results in the settings of collective spin systems and orthogonal polynomial sequences can be readily obtained as special cases. In particular, this approach allows for the calculation of higher order corrections to the zero distributions of a large class of orthogonal polynomials.

Comments:	25 pages, 8 figures
Subjects:	**Mathematical Physics (math-ph)**; Other Condensed Matter (cond-mat.other)
Cite as:	**arXiv:1206.0820 [math-ph]**
	(or **arXiv:1206.0820v1 [math-ph]** for this version)

Submission history

From: Johannes Kriel Dr. [view email]

[v1] Tue, 5 Jun 2012 04:53:12 GMT (753kb)

Which authors of this paper are endorsers?