

## Mathematical Physics

# Correlations of RMT Characteristic Polynomials and Integrability: Hermitean Matrices

Vladimir Al. Osipov, Eugene Kanzieper

*(Submitted on 3 Mar 2010)*

Integrable theory is formulated for correlation functions of characteristic polynomials associated with invariant non-Gaussian ensembles of Hermitean random matrices. By embedding the correlation functions of interest into a more general theory of tau-functions, we (i) identify a zoo of hierarchical relations satisfied by tau-functions in an abstract infinite-dimensional space, and (ii) present a technology to translate these relations into hierarchically structured nonlinear differential equations describing the correlation functions of characteristic polynomials in the physical, spectral space. Implications of this formalism for fermionic, bosonic, and supersymmetric variations of zero-dimensional replica field theories are discussed at length. A particular emphasis is placed on the phenomenon of fermionic-bosonic factorisation of random-matrix-theory correlation functions.

Comments: 62 pages, 1 table

Subjects: **Mathematical Physics (math-ph)**; Disordered Systems and Neural Networks (cond-mat.dis-nn); High Energy Physics - Theory (hep-th); Exactly Solvable and Integrable Systems (nlin.SI)Cite as: [arXiv:1003.0757v1](#) [math-ph]

## Submission history

From: Eugene Kanzieper [[view email](#)]

[v1] Wed, 3 Mar 2010 09:29:10 GMT (53kb)

[Which authors of this paper are endorsers?](#)

## Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

math-ph

[< prev](#) | [next >](#)[new](#) | [recent](#) | [1003](#)

Change to browse by:

[cond-mat](#)[cond-mat.dis-nn](#)[hep-th](#)[math](#)[nlin](#)[nlin.SI](#)

## References & Citations

- [CiteBase](#)

## Bookmark([what is this?](#))

 [CiteULike logo](#) [Connotea logo](#) [BibSonomy logo](#) [Mendeley logo](#) [Facebook logo](#) [del.icio.us logo](#) [Digg logo](#) [Reddit logo](#)