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Non-perturbative quantum geometry. (English) Zbl 1333.81346
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Summary: The β -ensemble with cubic potential can be used to study a quantum particle in a double-well potential with symmetry breaking term. The quantum mechanical perturbative energy arises from the ensemble free energy in a novel large N limit. A relation between the generating functions of the exact non-perturbative energy, similar in spirit to the one of Dunne-Ünsal, is found. The exact quantization condition of Zinn-Justin and Jentschura is equivalent to the Nekrasov-Shatashvili quantization condition on the level of the ensemble. Refined topological string theory in the Nekrasov-Shatashvili limit arises as a large N limit of quantum mechanics.

MSC:

81T30 String and superstring theories; other extended objects (e.g., branes)
in quantum field theory

Cited in **1** Review
Cited in **15** Documents

Keywords:

matrix models; topological strings

Full Text: [DOI](#) [arXiv](#)

References:

- [1] Seznec, R.; Zinn-Justin, J., Summation of divergent series by order dependent mappings: application to the anharmonic oscillator and critical exponents in field theory, J. Math. Phys., 20, 1398, (1979) · [Zbl 0495.65002](#) · [doi:10.1063/1.524247](#)
- [2] Buslaev, V.; Grecchi, V., Equivalence of unstable anharmonic oscillators and double wells, J. Physics, A 26, 20, (1993) · [Zbl 0817.47077](#)
- [3] Zinn-Justin, J.; Jentschura, U., Multi-instantons and exact results I: conjectures, WKB expansions and instanton interactions, Annals Phys., 313, 197, (2004) · [Zbl 1054.81020](#) · [doi:10.1016/j.aop.2004.04.004](#)
- [4] Zinn-Justin, J.; Jentschura, U., Multi-instantons and exact results II: specific cases, higher-order effects and numerical calculations, Annals Phys., 313, 269, (2004) · [Zbl 1054.81022](#) · [doi:10.1016/j.aop.2004.04.003](#)
- [5] Zinn-Justin, J., Multi-instanton contributions in quantum mechanics. 2, Nucl. Phys., B 218, 333, (1983) · [doi:10.1016/0550-3213\(83\)90369-3](#)
- [6] Zinn-Justin, J., From multi-instantons to exact results, Ann. Inst. Fourier, 53, 1259, (2003) · [Zbl 1073.81043](#) · [doi:10.5802/aif.1979](#)
- [7] Delabaere, E.; Dillinger, H.; Pham, F., Exact semiclassical expansions for one-dimensional quantum oscillators, J. Math. Phys., 38, 6126, (1997) · [Zbl 0896.34051](#) · [doi:10.1063/1.532206](#)
- [8] G.V. Dunne and M. Ünsal, \textit{Generating energy eigenvalue trans-series from perturbation theory}, arXiv:1306.4405 [INSPIRE].
- [9] R. Dijkgraaf and C. Vafa, \textit{Toda theories, matrix models, topological strings and $N = 2$ gauge systems}, arXiv:0909.2453 [INSPIRE]. · [Zbl 0999.81068](#)
- [10] Mironov, A.; Morozov, A., Nekrasov functions and exact Bohr-zommerfeld integrals, JHEP, 04, 040, (2010) · [Zbl 1272.81180](#) · [doi:10.1007/JHEP04\(2010\)040](#)
- [11] Aganagic, M.; Cheng, MC; Dijkgraaf, R.; Krefl, D.; Vafa, C., Quantum geometry of refined topological strings, JHEP, 11, 019, (2012) · [doi:10.1007/JHEP11\(2012\)019](#)
- [12] N.A. Nekrasov and S.L. Shatashvili, \textit{Quantization of integrable systems and four dimensional gauge theories}, arXiv:0908.4052 [INSPIRE]. · [Zbl 1214.83049](#)
- [13] Klemm, A.; Mariño, M.; Theisen, S., Gravitational corrections in supersymmetric gauge theory and matrix models, JHEP, 03, 051, (2003) · [doi:10.1088/1126-6708/2003/03/051](#)
- [14] Morozov, A.; Shakirov, S., The matrix model version of AGT conjecture and CIV-DV prepotential, JHEP, 08, 066, (2010) · [Zbl 1291.81263](#) · [doi:10.1007/JHEP08\(2010\)066](#)
- [15] Krefl, D.; Walcher, J., ABCD of beta ensembles and topological strings, JHEP, 11, 111, (2012) · [doi:10.1007/JHEP11\(2012\)111](#)
- [16] Matone, M., Instantons and recursion relations in $N = 2$ SUSY gauge theory, Phys. Lett., B 357, 342, (1995) · [doi:10.1016/0370-2693\(95\)00920-G](#)
- [17] Jentschura, UD; Zinn-Justin, J., Instantons in quantum mechanics and resurgent expansions, Phys. Lett., B 596, 138, (2004)

· [Zbl 1247.81135](#) · [doi:10.1016/j.physletb.2004.06.077](#)

- [18] Cachazo, F.; Intriligator, KA; Vafa, C., A large-N duality via a geometric transition, Nucl. Phys., B 603, 3, (2001) · [Zbl 0983.81050](#) · [doi:10.1016/S0550-3213\(01\)00228-0](#)
- [19] D. Krefl and J. Walcher, \textit{Shift versus extension in refined partition functions}, arXiv:1010.2635 [INSPIRE].
- [20] Marshakov, A.; Mironov, A.; Morozov, A., On AGT relations with surface operator insertion and stationary limit of beta-ensembles, J. Geom. Phys., 61, 1203, (2011) · [Zbl 1215.81092](#) · [doi:10.1016/j.geomphys.2011.01.012](#)
- [21] G. Bonelli, K. Maruyoshi and A. Tanzini, \textit{Quantum Hitchin systems via β -deformed matrix models}, arXiv:1104.4016 [INSPIRE]. · [Zbl 1386.81140](#)
- [22] Zinn-Justin, J., Quantum field theory and critical phenomena, Int. Ser. Monogr. Phys., 113, 1, (2002)
- [23] Mariño, M.; Schiappa, R.; Weiss, M., Nonperturbative effects and the large-order behavior of matrix models and topological strings, Commun. Num. Theor. Phys., 2, 349, (2008) · [Zbl 1153.81526](#) · [doi:10.4310/CNTP.2008.v2.n2.a3](#)
- [24] J. Kallen and M. Mariño, \textit{Instanton effects and quantum spectral curves}, arXiv:1308.6485 [INSPIRE].
- [25] Y. Hatsuda, M. Mariño, S. Moriyama and K. Okuyama, \textit{Non-perturbative effects and the refined topological string}, arXiv:1306.1734 [INSPIRE]. · [Zbl 1333.81336](#)
- [26] Krefl, D.; Schwarz, A., Refined Chern-Simons versus vogel universality, J. Geom. Phys., 74, 119, (2013) · [Zbl 1283.58018](#) · [doi:10.1016/j.geomphys.2013.08.002](#)

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