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Enumerating coloured partitions in 2 and 3 dimensions. (English) Zbl 1472.05017
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Summary: We study generating functions of ordinary and plane partitions coloured by the action of a finite subgroup of the corresponding special linear group. After reviewing known results for the case of ordinary partitions, we formulate a conjecture concerning a basic factorisation property of the generating function of coloured plane partitions that can be thought of as an orbifold analogue of a conjecture of D. Maulik et al. [Compos. Math. 142, No. 5, 1263–1285 (2006; Zbl 1108.14046)], now a theorem, in three-dimensional Donaldson-Thomas theory. We study natural quantisations of the generating functions arising from geometry, discuss a quantised version of our conjecture, and prove a positivity result for the quantised coloured plane partition function under a geometric assumption.

MSC:
05A17 Combinatorial aspects of partitions of integers
05A15 Exact enumeration problems, generating functions
14N35 Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebro-geometric aspects)
11P83 Partitions; congruences and congruential restrictions

Keywords: generating functions; boxes; Donaldson-Thomas partition function

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References:
[1] Andrews, G. E.. The theory of partitions. Encyclopedia Math. Appl.2 (Addison-Wesley, Reading, Mass., 1976).
[2] Batyrev, V. V.. Non-Archimedean integrals and stringy Euler numbers of log-terminal pairs. J. Eur. Math. Soc.1 (1999), 5-33. · Zbl 0943.14004
[3] Bejleri, D. and Zaimi, G.. The topology of equivariant Hilbert schemes, arXiv:1512.05774.
[4] Behrend, K.. Donaldson-Thomas type invariants via microlocal geometry. Ann. of Math. (2) 170 (2009), 1307-1338. · Zbl 1191.14050
[5] Behrend, K. and Fantechi, B.. Symmetric obstruction theories and Hilbert schemes of points on threefolds, Algebra Number Theory2 (2008), 313-345. · Zbl 1170.14004
[6] Benini, F., Benvenuti, S. and Tachikawa, Y.. Webs of five-branes and N = 2 superconformal field theories. J. High Energy Phys.9 (2009), 052.
[7] Bridgeland, T.. Equivalences of triangulated categories and Fourier-Mukai transforms. Bull. London. Math. Soc.131(1) (1999), 25-34. · Zbl 0987.18012
[8] Bridgeland, T., King, A. and Reid, M.. The McKay correspondence as an equivalence of derived categories, J. Amer. Math. Soc.14 (2001), 535-554. · Zbl 0966.14028
[9] Cox, D., Little, J. and Schenck, H.. Toric varieties. Graduate studies in Math. AMS, 124 (2011).
[10] Davison, B.. The critical CohA of a quiver with potential. Quart. J. Math.68(2) (2017), 635-703. · Zbl 1390.14056
[11] Davison, B.. Purity of critical cohomology and Kac’s conjecture. Math. Res. Lett.25(2) (2018), 469-488. · Zbl 1419.16010
[12] Davison, B.. The integrality conjecture and the cohomology of preprojective stacks. arXiv:1602.02110
[13] Davison, B. and Meinhardt, S.. Cohomological Donaldson-Thomas theory of a quiver with potential and quantum enveloping algebras. arXiv:1601.02479. · Zbl 1462.14020
[14] Engel, J. and Reineke, M.. Smooth models of quiver moduli. Math. Z.262(4) (2009), 817-848. · Zbl 1231.16014
[15] Fuji, S. and Minabe, S.. A combinatorial study on quiver varieties. SIGMA Symmetry Integrability Geom. Methods Appl.13 (2017), 052. · Zbl 1376.14015
[16] Ginzburg, V.. Calabi-Yau algebras. arXiv:math/0612139. · Zbl 1204.14004
[17] Garvan, F., Kim, D. and Stanton, D.. Cranks and t-cores. Invent. Math.101 (1990), 1-17. · Zbl 0721.11030
[18] Gyenge, Á., Némethi, A. and Szendrői, B.. Euler characteristics of Hilbert schemes of points on simple surface singularities.
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