A Dubrovin-Frobenius manifold structure of NLS type on the orbit space of $B_n$. (English)

Summary: Generalizing a construction presented in Arsie and Lorenzoni (Lett Math Phys 107:1919-1961, 2017), we show that the orbit space of $B_2$ less the image of the coordinate lines under the quotient map is equipped with two Dubrovin-Frobenius manifold structures which are related respectively to the defocusing and the focusing nonlinear Schrödinger (NLS) equations. Motivated by this example, we study the case of $B_n$ and we show that the defocusing case can be generalized to arbitrary $n$ leading to a Dubrovin-Frobenius manifold structure on the orbit space of the group. The construction is based on the existence of a non-degenerate and non-constant invariant bilinear form that plays the role of the Euclidean metric in the Dubrovin-Saito standard setting. Up to $n = 4$ the prepotentials we get coincide with those associated with the constrained KP equations discussed in Liu et al. (J Geom Phys 97:177-189, 2015).

MSC:

53D45 Gromov-Witten invariants, quantum cohomology, Frobenius manifolds
20F55 Reflection and Coxeter groups (group-theoretic aspects)
37K25 Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with topology, geometry and differential geometry

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References:


