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Chapter 1 : Wolfgang Ebeling | Open Library

The ramification of (analytic continuations of) these potential depends on a monodromy group, which can be considered as a proper subgroup of the local monodromy group of a complete intersection.

Let Y be a Calabi-Yau complete intersection in a weighted projective space. We show that the space of quadratic invariants of the hypergeometric group associated with the twisted I-function is one-dimensional, and spanned by the Gram matrix of a split-generator of the derived category of coherent sheaves on Y with respect to the Euler form. Key words and phrases. The local system Lred defined by Hred is irreducible, and its rank Qred is smaller than the rank Q of the local system L defined by H. The irreducible system Lred supports a pure and polarized variation of Hodge structures, whose Hodge numbers are computed by Corti and Golyshev [CG11, Theorem 1. The mirror of Y is identified by Batyrev and Borisov [BB96] as the family of toric complete intersections whose affine part is given by 1. The period integral Z xq If the system is irreducible, then a result of Levelt [Lev61] states that the monodromy group is conjugate to the hypergeometric group Hq,d. Although the sys- tem L is reducible and one can not apply the result of Levelt directly, we can show the following: The following is a corollary of Theorem 1. This theorem is closely related to the works of Horja [Hor, Theorem 4. The main difference from their works is that we work with the reducible system L which contains solutions not coming from period integrals on the mirror manifold. Although the geometric meaning of these extra solutions is unclear, Theorem 1. The organization of this paper is as follows: The proof of Theorem 1. The essential step is to show the existence of a cyclic vector for the monodromy around the origin, which satisfies additional condition with respect to the monodromy at infinity. The uniqueness of the invariant of the hypergeometric group is shown in Section 3, and the invariance of the Gram matrix of the split-generator with respect to the Euler form is shown in Section 4. In Section 5, we discuss the relationship between the Gram matrix in Theorem 1. We thank Hiroshi Iritani for valuable discussions. Monodromy of hypergeometric equation We prove Theorem 1. The 3 following lemma is used by Levelt [Lev61] to compute the monodromy of hypergeometric functions see also Beukers and Heckman [BH89, Theorem 3. Assume that there exists a vector satisfying 2. Then the monodromy group of 1. Even if there is no vector satisfying 2. Hence the proof of Theorem 1. There exists a vector v in the space of solutions of 1. The rest of this section is devoted to the proof of Proposition 2. The hypergeo- metric differential equation 1. A basis of solutions to 1. Alternatively, one can also argue as follows: On Pcalculating its residues, we obtain a red p subspace of solutions to 1. XQ z of solutions to 1. Then one can remove a common factor in 1. By a straightforward calculation, we have the following: Hence a non-trivial solution to 2. Invariants of the hypergeometric group We prove the following in this section: Coherent sheaves on Calabi-Yau complete intersections in weighted projective spaces We prove the Hq,d -invariance of the Gram matrix in Theorem 1. Let Y be a smooth complete intersection of degree d1 ,. The Euler form on the Grothendieck group K P defined by 1. X is an invariant of the hypergeometric group Hq,d. We divide the proof into three steps. Mirror manifolds and Stokes matrices In this section, we discuss the relation between the Gram matrix in Theorem 1. It follows that the stationary-phase integrals Z 5. The stationary-phase integral 5. Lefschetz thimbles On the other hand, Picard-Lefschetz formula see e. It follows that the rank of K Y is given by j " N r! By virtue of Lemmas 4. Varchenko, Singularities of differentiable maps. II, Monographs in Mathematics, vol. Batyrev and Lev A. Borisov, On Calabi-Yau complete intersections in toric varieties, Higher-dimensional complex varieties Trento, , de Gruyter, Berlin, , pp. II Berlin, , no. Golyshev, Riemann-Roch variations, Izv. Levelt, Hypergeometric functions, Indag.

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