

Lian, Bong H.; Yau, Shing-Tung

The n th root of the mirror map. (English) Zbl 1048.11049

Yui, Noriko (ed.) et al., Calabi-Yau varieties and mirror symmetry. Providence, RI: American Mathematical Society (AMS) (ISBN 0-8218-3355-3/hbk). Fields Inst. Commun. 38, 195-199 (2003).

The authors consider the differential equation

$$(\Theta^{N-1} - Nz(N\Theta + 1) \cdots (N\Theta + N - 1))f(z) = 0$$

where $\Theta = z \frac{d}{dz}$, N is an odd prime number. Let f_N, g_N be the power series solutions, with the asymptotic form $f_N(z) = 1 + O(z)$, $g_N(z) = f_N(z) \log z + G_N(z)$, $G_N(z) = O(z)$. It is proved that all the coefficients of the power series $\exp\left(\frac{G_N}{Nf_N}\right)$ are integers. This result implies the integrality property of the N th root of the mirror map of a Calabi-Yau manifold and improves an earlier result [*B. H. Lian and S. T. Yau, Lectures in algebra and geometry. Proceedings of the international conference on algebra and geometry, National Taiwan University, Taipei, Taiwan, 1995, 215–227 (1998; Zbl 0998.12009)*] about the integrality of $\exp\left(\frac{G_N}{f_N}\right)$.

The technique is based on Dwork's theory of p -adic hypergeometric functions [*B. Dwork, Ann. Sci. Éc. Norm. Supér., IV. Ser. 6, 295–315 (1973; Zbl 0309.14020)*].

For the entire collection see [[Zbl 1022.00014](#)].

Reviewer: [Anatoly N. Kochubei \(Kyiv\)](#)

MSC:

[11G25](#) Varieties over finite and local fields

[34M15](#) Algebraic aspects (differential-algebraic, hypertranscendence, group-theoretical) of ordinary differential equations in the complex domain

[12H25](#) p -adic differential equations

[14J32](#) Calabi-Yau manifolds (algebraic-geometric aspects)

[32Q25](#) Calabi-Yau theory (complex-analytic aspects)

[33C20](#) Generalized hypergeometric series, ${}_pF_q$

Cited in 4 Documents

Keywords:

[mirror map](#); [Calabi-Yau manifold](#); [\$p\$ -adic hypergeometric equation](#)