

**Lian, Bong H.; Song, Ruifang; Yau, Shing-Tung****Periodic integrals and tautological systems.** (English) Zbl 1272.14033

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The authors' purpose of this important paper is to study period integrals and deformations of  $CY$  complete intersections in homogeneous spaces. They mostly restrict to partial flag varieties. After clear and very intuitive introduction the authors prove that the universal family of  $CY$  manifolds is deformation complete. Next, they give an explicit construction of  $D$ -modules that governs the period integrals. In order to achieve this construction they introduce a special type of differential systems called *tautological*. More precisely, for a fixed reductive algebraic group  $G$ , to every  $G$ -variety  $X$  equipped with a very ample equivariant line bundle  $L$ , they attach a system of differential operators defined on  $H^0(X, L)$ , depending on a group character. They show that the system is regular holonomic when  $X$  is a homogeneous space. A number of illuminating examples are discussed. In the last section of the paper, they discuss several numerical examples and their solutions.

Reviewer: [Zbigniew Hajto \(Kraków\)](#)**MSC:**

- [14J32](#) Calabi-Yau manifolds (algebraic-geometric aspects)
- [14M15](#) Grassmannians, Schubert varieties, flag manifolds
- [14J45](#) Fano varieties
- [34M55](#) Painlevé and other special ordinary differential equations in the complex domain; classification, hierarchies
- [14D05](#) Structure of families (Picard-Lefschetz, monodromy, etc.)
- [33C80](#) Connections of hypergeometric functions with groups and algebras, and related topics

Cited in **4** Reviews  
Cited in **3** Documents**Keywords:**[Calabi-Yau](#); [period integrals](#); [Picard-Fuchs systems](#); [partial flag varieties](#)**Full Text:** [DOI](#) [arXiv](#)**References:**

- [1] Adolphson, A.: Hypergeometric functions and rings generated by monomials. Duke Math. J. 73, 269-290 (1994) · [Zbl 0804.33013](#) · [doi:10.1215/S0012-7094-94-07313-4](#)

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