

Holonomic Techniques for Feynman Integrals



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A Survey on (un)Twisted Logarithmic Comparison Theorems

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The comparison theorems of Grothendieck and Deligne tell us that to compute cohomology of the complement of a hypersurface with constant coefficients one must compute the cohomology of the meromorphic (or rational) de Rham complex. As this complex's objects lack finiteness, one wonders if a subcomplex of forms of order at most one along the hypersurface suffices. In verbiage: does the Logarithmic Comparison Theorem hold? We will survey the recent results on this problem, which, time permitting, may include: making the statement of the Logarithmic Comparison Theorem, and its twisted versions, explicit; verifying the (un)Twisted Logarithmic Comparison theorems for hyperplane arrangements, resolving a conjecture Terao from the 1970s; an explicit D-module theoretic formulation of the problem in the spirit of the Riemann Hilbert correspondence; applications to Bernstein—Sato polynomials; how to use the (un)Twisted Logarithmic Comparison theorem to turn computations into finite dimensional linear algebra.

Based on solo work by the speaker (arXiv: 2202.01462) and joint work with Morihiko Saito (arXiv: 2203.11716).

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