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When ε-Factorisation Goes Bananas: Peeling Back the Geometry

Friday 7 November 2025 10:00 (40 minutes)

I present the computation of the three-loop banana integral with four unequal masses in dimensional regularisation. This integral is associated to a family of K3 surfaces, thus representing an example for Feynman integrals with geometries beyond elliptic curves.
We evaluate the integral by deriving an ε-factorised differential equation, for which I rely on the algorithm presented in a recent publication. Equipping the space of differential forms in Baikov representation by a set of filtrations inspired by Hodge theory, I first talk about how to obtain a differential equation with entries as Laurent polynomials in ε. Via a sequence of basis rotations the non-epsilon factories terms are removed. This procedure is algorithmic and at no point relies on prior knowledge of the underlying geometry.

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