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SEPARATING PERIODS OF QUARTIC SURFACES

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Abstract

Kontsevich–Zagier periods form a natural number system that extends the algebraic numbers by adding constants coming from geometry and physics. Because there are countably many periods, one would expect it to be possible to compute effectively in this number system. This would require an effective height function and the ability to separate periods of bounded height, neither of which are currently possible. In this talk, we introduce an effective height function for periods of quartic surfaces defined over algebraic numbers. We also determine the minimal distance between periods of bounded height on a single surface. We use these results to prove heuristic computations of Picard groups that rely on approximations of periods. Moreover, we give explicit Liouville type numbers that can not be the ratio of two periods of a quartic surface. This is ongoing work with Pierre Lairez (Inria, France).

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