

Topology and periods of elliptic surfaces

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Complex elliptic surfaces are smooth surfaces equipped with a fibration over a complex curve, such that the generic fibre is an elliptic curve. Such varieties appear in theoretical physics, from Feynman integrals, and in number theory, for example in relation to the Apéry sequences. The periods of an elliptic surface are rational integrals that characterise its geometry. The computation of numerical approximations of these integrals provides a heuristic but effective way of recovering several algebraic invariants of the surfaces, such as the Néron-Severi lattice and the Mordell-Weil group. In this talk, I will present an algorithm for computing the homology and periods of elliptic surfaces over the projective line using transcendental numerical methods.