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Visualizing elements of $\text{III}[3]$ in genus 2 jacobians

Visualizing an element of the Shafarevich–Tate group of an elliptic curve over a number field refers to representing this element in a certain way as a curve in an abelian variety. Mazur introduced this notion and proved that every element of order three can be visualized in an abelian surface (over the ground field). In this talk we explain the notion of visibility in more detail, show that the abelian surface in Mazur’s result can actually be taken to be a jacobian of a genus 2 curve and give an explicit construction of this genus 2 curve.

This is joint work with Nils Bruin.