Towards a Manin-type conjecture for the growth of rational points of bounded height on K3 surfaces.

Erik Visse
Universiteit Leiden

Over the last few decades mathematicians have done much research into the growth of the number of rational points of bounded height on Fano varieties, following a conjecture that Manin stated in the 1980's. The conjecture states that for any Fano variety over a number field k, embedded into projective space endowed with height function H, there exists an open subvariety U such that the function

$$N_U(B) := \#\{x \in U(k) | H(x) \leq B\}$$

asymptotically behaves as $c \cdot B^a (\log B)^b$, where each of the constants a, b and c have a geometric interpretation, which for c was given by Peyre.

Stated in this generality, the conjecture is known to be false, but there exist several proposed fixes. For surfaces the conjecture appears to be true.

The next interesting step to take is to extend the conjecture to the class of K3 surfaces, where we expect a different asymptotic behaviour, or at least we need to adjust the interpretation of the constants. My talk focuses on a family of diagonal quartic surfaces and gives heuristic evidence for a Manin-type conjecture based on calculations that involve the circle method.