

Solving S -unit equations via the Shimura-Taniyama conjecture

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In this talk we present practical algorithms to solve classical S -unit equations.

As an example we computed the set of all integers a, b, c with $a + b = c$ with $\text{rad}(abc) \leq 10^7$.

Our algorithms rely on new height bounds, which we obtained using the method of Faltings (Arakelov, Parshin, Szpiro) combined with the Shimura-Taniyama conjecture (without relying on linear forms in logarithms), as well as several improved and new sieves and computing lattice points.

In addition we used the resulting data to motivate several conjectures and questions, such as Baker's explicit abc-conjecture, and a new conjecture on the number of solutions to S -unit equations.

This is joint work with Rafael von Känel.