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Modular approach to Diophantine equation $x^p + y^p = z^3$ over some number fields

Solving Diophantine equations, in particular, Fermat-type equations is one of the oldest and most widely studied topics in mathematics. After Wiles' proof of Fermat's Last Theorem using his celebrated modularity theorem, several mathematicians have attempted to extend this approach to various Diophantine equations and number fields over several number fields.

The method used in the proof of this theorem is now called the "modular approach", which makes use of the relation between modular forms and elliptic curves. I will first briefly mention the main steps of the modular approach, and then report our asymptotic result (joint work Ozman and Kara) on the solutions of the Fermat-type equation $x^p+y^p = z^3$ over various number fields.