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Diophantine equations via Galois representations

Recently, the use of Galois representations attached to elliptic curves has been used to resolve several cases of the generalized Fermat equation. In this talk, I will discuss the method and some further cases which can be analyzed at least partially, including the equation $a^2 + b^2p = c^r$, where $r = 3$ or 5 . Although a complete resolution is not yet possible, a computational criterion can be obtained for $r = 3$, based on previous work by Bennett–Skinner and Kraus. For $r = 5$, I outline a possible strategy using a combination of quadratic Q -curves and elliptic curves over Q .