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Studying Hilbert's 10th problem via explicit elliptic curves

N. García-Fritz and H. Pasten showed that Hilbert's 10th problem is unsolvable in the ring of integers of number fields of the form $\mathbb{Q}(\sqrt[3]{p}, \sqrt{-q})$ for positive proportions of primes p and q. In joint work with A. Lei and F. Sprung, we improve their proportions and extend their results to the case of other number fields. We achieve this by replacing their Iwasawa theory arguments by a more direct method.