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The number of positive integer points on the elliptic curve $y^2 = pqx(x^2 + 2)$. (Chinese. English summary) [Zbl 07404465]

Summary: Let $p$ and $q$ be distinct odd primes. Using certain properties of binary quartic Diophantine equations with elementary number theory methods, we prove that the elliptic curve $y^2 = pqx(x^2 + 2)$ has at most five positive integer points $(x, y)$. In particular, if $(p, q) \not\equiv (1, 3), (3, 1)$ or $(3, 3) \pmod{8}$, then the curve has at most four positive integer points $(x, y)$.

MSC:

14H52 Elliptic curves
11D25 Cubic and quartic Diophantine equations

Keywords:
elliptic curve; positive integer point; binary quartic Diophantine equation