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TORSION POINTS ON ELLIPTIC CURVES

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1. STATEMENT OF THE PROBLEM

The study of elliptic curves has long occupied a central place in number theory. We recall that an elliptic curve is an abelian variety of dimension one, or equivalently, an irreducible nonsingular projective algebraic curve of genus one, equipped with a distinguished point O, which is the origin for the group law (see [10] or [11] for a general survey of the subject). Let E be an elliptic curve defined over a number field K. The Mordell–Weil theorem states that the group $E(K)$ of K-rational points of E is a finitely generated abelian group. One of the classical conjectures in the theory of elliptic curves is the Uniform Boundedness Conjecture that there is a positive integer B_K (depending on K) such that if E is any elliptic curve over K, then the order of the torsion subgroup $E(K)_{\text{tors}}$ of $E(K)$ is less than B_K. A stronger form of this conjecture asserts that B_K depends not on K, but only on $d = [K:\mathbf{Q}]$ (i.e., the same bound B works for every number field whose degree over $\mathbf{Q}$ is d).

2. KNOWN RESULTS

In 1969 Manin [5] proved a local version of this conjecture. He showed that for each prime p, and each number field K, there is

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