

On the construction of rational points on elliptic curves

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Abstract

For an elliptic curve defined over a number field, Mordell's Theorem asserts that the points on the curve with coordinates in the number field form a finitely generated abelian group. While the torsion part of this group is considered to be well-understood, the rank of the infinite part is very difficult to compute in general. In an effort to understand this quantity better, Darmon has proposed a conjectural construction of so-called Stark–Heegner points. We will begin by presenting a prototypical example of such a construction found in the work of Gross and Zagier, which is really quite simple. Building on this framework, we will explain how this can be generalized to construct points on a larger class of elliptic curves.