Counting Elliptic Curves with a Cyclic m-isogeny over $\mathbb{Q}$

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Abstract

Using methods from analytic number theory, for $m > 5$ and for $m = 4$, we obtain asymptotics with power-saving error terms for counts of elliptic curves with a cyclic m-isogeny up to quadratic twist over the rational numbers. For $m > 5$, we then apply a Tauberian theorem to achieve asymptotics with power saving error for counts of elliptic curves with a cyclic m-isogeny up to isomorphism over the rational numbers.