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Linear forms in logarithms, effectivity and elliptic curves

LINEAR FORMS IN LOGARITHMS, EFFECTIVITY
AND ELLIPTIC CURVES.

by Alf van der Poorten

It is well known that effectively computable lower bounds for linear forms in logarithms, in both the complex and p-adic cases, provide an effective method for computing all integer points on an elliptic curve (or, for that matter, on appropriate curves of higher genus). In particular, since elliptic curves, of given conductor give rise to integer points on (other) elliptic curves one may effectively compute all elliptic curves over $\mathbb{Q}$ of given conductor. What is not so well known is that these effective methods have been rendered quite practical by a combination of improved computer technology and by a sharpening of the lower bounds for linear forms in logarithms. Where once the concept "Baker bound" was synonymous with "absurdly large, but finite, number" the bounds that we now obtain in Baker's method may be quite reasonable numbers of order 10^{10} or so. We will discuss these matters and related computations concerning elliptic curves over $\mathbb{Q}$.

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