ON THE ELLIPTIC LOGARITHM METHOD FOR ELLIPTIC DIOPHANTINE EQUATIONS: REFLECTIONS AND AN IMPROVEMENT

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Abstract. The elliptic logarithm method for the determination of all integral solutions of a given elliptic equation is discussed for equations with associated elliptic curve of moderately large rank. Major attention is given to the question of optimizing the choice of Mordell–Weil basis for the curves in question. A speculative argument suggests that for any curve of rank larger then 8 the calculations involved are unlikely to be feasible. The arguments are illustrated by examples of curves of rank 5, 6, 7, and 8, taken from the literature.