

Exposé court

148 *Divisibility by 2 on quartic models of elliptic curves and rational Diophantine $D(q)$ -quintuples*

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Let C be a smooth genus one curve described by a quartic polynomial equation over the rational field \mathbb{Q} with $P \in C(\mathbb{Q})$. In this talk, I'll describe joint work with Mohammad Sadek, giving an explicit criterion for the divisibility-by-2 of a rational point on the elliptic curve (C, P) . This generalizes the classical criterion of the divisibility-by-2 on elliptic curves described by Weierstrass equations.

We also employ this criterion to investigate the question of extending a rational $D(q)$ -quadruple to a quintuple. We give concrete examples to which we can give an affirmative answer. One of these results implies that although the rational $D(16t+9)$ -quadruple $\{t, 16t+8, 225t+14, 36t+20\}$ can not be extended to a polynomial $D(16t+9)$ -quintuple using a linear polynomial, there are infinitely many rational values of t for which the aforementioned rational $D(16t+9)$ -quadruple can be extended to a rational $D(16t+9)$ -quintuple. Moreover, these infinitely many values of t are parametrized by the rational points on a certain elliptic curve of positive Mordell-Weil rank.