

\mathbb{Q} -CURVES, HECKE CHARACTERS, AND SOME DIOPHANTINE EQUATIONS II

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Abstract: In the article [25] a general procedure to study solutions of the equations $x^4 - dy^2 = z^p$ was presented for negative values of d . The purpose of the present article is to extend our previous results to positive values of d . On doing so, we give a description of the extension $\mathbb{Q}(\sqrt{d}, \sqrt{\epsilon})/\mathbb{Q}(\sqrt{d})$ (where ϵ is a fundamental unit) needed to prove the existence of a Hecke character over $\mathbb{Q}(\sqrt{d})$ with prescribed local conditions. We also extend some “large image” results due to Ellenberg regarding images of Galois representations coming from \mathbb{Q} -curves from imaginary to real quadratic fields.

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