

**ON ELLIPTIC UNITS AND p -ADIC GALOIS
REPRESENTATIONS ATTACHED TO ELLIPTIC
CURVES**

ÁLVARO LOZANO-ROBLEDO

Let K be a quadratic imaginary number field with discriminant $D_K \neq -3, -4$ and class number one. Fix a prime $p \geq 7$ which is not ramified in K and write h_p for the class number of the ray class field of K of conductor p . Given an elliptic curve A/K with complex multiplication by K , let $\overline{\rho}_A: \text{Gal}(\overline{K}/K(\mu_{p^\infty})) \rightarrow \text{SL}(2, \mathbb{Z}_p)$ be the representation which arises from the action of Galois on the Tate module. Herein it is shown that if $p \nmid h_p$ then the image of a certain deformation $\rho_A: \text{Gal}(\overline{K}/K(\mu_{p^\infty})) \rightarrow \text{SL}(2, \mathbb{Z}_p[[X]])$ of $\overline{\rho}_A$ is “as big as possible”, that is, it is the full inverse image of a Cartan subgroup of $\text{SL}(2, \mathbb{Z}_p)$. The proof rests on the theory of Siegel functions and elliptic units as developed by Kubert, Lang and Robert.

E-mail address: alozano@colby.edu

DEPARTMENT OF MATHEMATICS (MUDD 406), COLBY COLLEGE, WATERVILLE, MAINE, 04901, U.S.A.