

1023-11-1291

James M. Mailhot* (jim.mailhot@stanfordalumni.org). *On Selmer groups in a family of elliptic curves with reducible 2- and 3-torsion and 3-ranks of class groups of quadratic number fields.* Preliminary report.

For elliptic curves with reducible p -torsion (where p is a prime) we obtain bounds for the p -rank of the Selmer group by studying local behavior of the curve at p , ∞ and primes of bad reduction. The method of producing the bounds works well in analyzing families of quadratic twists. The flavor of these bounds is different for $p = 2$ and p odd. We consider the family of quadratic twists by d of the curve $y^2 + xy + y = x^3 + x + 2$ (30a1 in Cremona's tables), which has a rational point of order 6, hence reducible 2- and 3-torsion. By choosing d appropriately, we can force the 2-rank of the Selmer group to be large. In turn, this forces either the 2-rank of the Tate-Shafarevich group or the 3-rank of the class group of $\mathbf{Q}(\sqrt{d})$ to be large. (Received September 26, 2006)