
JONATHAN LOVE, McGill University / CRM

On ℓ -torsion of superelliptic Jacobians over finite fields

For a prime $\ell \geq 3$, we study the ℓ -torsion subgroup of Jacobians J of curves $y^\ell = f(t)$ over a finite field \mathbf{F}_q . When $f(t)$ is a monic irreducible polynomial and q and $d := \deg(f)$ are both coprime to ℓ , we give an upper bound on the ℓ -rank of $J(\mathbf{F}_q)$ that depends only on q and d . Using tools from Galois cohomology, we prove that the ℓ -rank achieves this upper bound whenever $q^2 \equiv 1 \pmod{\ell}$, and we find congruence conditions that can often be used to determine the ℓ -rank when the upper bound alone is not sufficient. This is joint work with Wanlin Li and Eric Stubbley.