Exponents of Class Groups of Quadratic Function Fields over Finite Fields

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Abstract. We find a lower bound on the number of imaginary quadratic extensions of the function field $\mathbb{F}_q(T)$ whose class groups have an element of a fixed order.

More precisely, let $q \geq 5$ be a power of an odd prime and let $g$ be a fixed positive integer $\geq 3$. There are $\gg q^{(1/2)(1+1/g)}$ polynomials $D \in \mathbb{F}_q[T]$ with $\deg(D) \leq \ell$ such that the class groups of the quadratic extensions $\mathbb{F}_q(T, \sqrt{D})$ have an element of order $g$. 

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