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Thesis Abstract

Thesis Title: Torsion Subgroups of Elliptic Curves over Function Fields

Abstract: *Let $k = \mathbb{F}_q$ be a finite field of characteristic p, and $\mathcal{C}$ be a smooth, projective, absolutely irreducible curve over k. Let $K = k(\mathcal{C})$, and E be a non-isotrivial elliptic curve over K. Then, $E(K)$ is a finitely generated abelian group, and there is a finite list of possible torsion subgroups which can appear that depends only on $\mathcal{C}$ and p. When the genus of $\mathcal{C}$ is zero and $p \neq 2, 3$, a minimal list of prime-to-p torsion subgroups has been determined by Cox and Parry. In this thesis, we extend this result to one for all primes p, and present an analogue for genus 1 base curves. Additionally, we will determine the complete list of full torsion subgroups possible for a non-isotrivial E/K when the genus of $\mathcal{C}$ is 0 or 1, and discuss preliminary results for when $\mathcal{C}$ is a hyper-elliptic curve.*