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Title: Automorphism Groups of Curves with Even Genus in Positive Characteristic

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Abstract: For an (algebraic, projective, absolutely irreducible) curve $\mathcal{X}$ defined over an algebraically closed field K of positive characteristic p, let $\mathrm{Aut}(\mathcal{X})$ be the group of all automorphisms of $\mathcal{X}$ fixing K element-wise. By a classical result, $\mathrm{Aut}(\mathcal{X})$ is finite if the genus $\mathfrak{g}$ of $\mathcal{X}$ is at least two.

The p-rank of $\mathcal{X}$ (also called the Hasse-Witt invariant) is the integer γ so that the Jacobian of $\mathcal{X}$ has p^γ points of order p. It is known that $0 \leq \gamma \leq \mathfrak{g}$.

In this survey we focus on the following issues concerning a subgroup G of $\mathrm{Aut}(\mathcal{X})$:

(i) Upper bounds on the size of G depending on $\mathfrak{g}$, the case where G is a solvable group.

(ii) Lower bounds on the size of G depending on $\mathfrak{g}$ which yield $\gamma = 0$.

(iii) The structure of G when $\mathfrak{g}$ is even.

The study of the automorphism group of an algebraic curve is mostly carried out by using Galois Theory, via the fundamental group of the curve. Here, we adopt a different approach in order to exploit the potential of Finite Group Theory.