Arithmetic Geometry in Characteristic Two: Rational Points on Artin–Schreier Conics and Local Brauer Invariants

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Abstract: Arithmetic geometry studies rational points on algebraic varieties using techniques from algebraic geometry and number theory. In characteristic two, Artin–Schreier theory describes separable quadratic extensions of fields of characteristic two. It provides a natural way to study norm equations, quaternion algebras, and rational points on conics. This poster provides how an Artin–Schreier extension and a nonzero parameter determine both a projective conic and a class in the Brauer group. The conic has a rational point exactly when the parameter is a norm from the associated extension; or equivalently, when the corresponding Brauer class is trivial. We then consider quadratic constant extensions of global function fields and describe how the degree of a place and the parity of a valuation determine local splitting and the local Brauer invariant. Computations over $\mathbb{F}_2(t)$ and its completions show how local invariants help to the study of rational points and Brauer–Manin obstructions.