THE RELATIVE CANONICAL EMBEDDING OF CURVES WITH AUTOMORPHISMS

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ABSTRACT. Despite the progress made in the recent years, the list open problems in characteristic p algebraic arithmetic geometry remains extensive. One of the strategies that has proven to be succesful, initially proposed by J. P. Serre in his Mexico paper, is the technique of *lifting to characteristic* 0: problems like the Galois module structure of (poly)differentials and Green's syzygy conjecture are well understood in characteristic 0 but remain open in characteristic p. The above problems share a second interesting property: they involve the *canonical sheaf* Ω, which appears prominently in the classical theorem of M. Noether, F. Enriques and K. Petri. In this talk, following a review of the theory of lifting curves with automorphisms and the Noether-Enriques-Petri theorem, we will present joint work with H. Charalambous and A. Kontogeorgis, in which we study the *relative canonical embedding* of the flat family of curves obtained from lifting an Artin-Schreier curve to a Kummer curve. Combining elements of Gröbner theory with deformation-theoretic arguments we will give an explicit set of generators for the *relative canonical ideal*, obtaining in the process a relative version of Petri's theorem.

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