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Exceptional Automorphisms of (generalized) Super-elliptic Curves. Preliminary report

Abstract A super-elliptic curve S is a curve with a conformal automorphism g of prime order p such that $S/\langle g\rangle$ has genus zero. This generalizes the hyper-elliptic case $p = 2$. More generally, a cyclic n-gonal surface S has an automorphism g of order n such that $S/\langle g\rangle$ has genus zero. All cyclic n-gonal surfaces have tractable defining equations. Let $A = Aut(S)$ and N be the normalizer of $C = \langle g\rangle$ in A. The structure of N can in principal be determined by the action of N/C on the sphere S/C which in turn can be determined from the defining equation. If the genus of S is sufficiently large in comparison to n, then $A = N$. For small genus A/N may not be empty and, in this case, any automorphism h in A/N is called exceptional. The exceptional automorphisms of super-elliptic curves are known whereas the determination of exceptional automorphisms of all general cyclic n-gonal surfaces seems to be hard. In this talk we focus on generalized super-elliptic curves in which the projection of S onto S/C is fully ramified. Generalized super-elliptic curves are easily identified by their defining equations. In this talk we determine large classes of (generalized) super-elliptic curves with exceptional automorphisms.
This is joint work with Aaron Wootton.