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Vishal Arul, Alex Best, Edgar Costa, Richard Magner and Nicholas Triantafillou*

(ngtriant@mit.edu). *Computing Zeta Functions of Superelliptic Curves in Large Characteristic.*

We describe an algorithm to compute the zeta function of a cyclic cover of the projective line over a finite field of characteristic p that runs in time $p^{1/2+o(1)}$. The algorithm extends both Gonçalves's generalization of Kedlaya's algorithm for cyclic covers, and Harvey's work on Kedlaya's algorithm for large characteristic. We confirm its practicality and effectiveness by reporting on the performance of our SAGEMATH implementation on a range of examples.

Our work provides a valuable tool for the study of superelliptic curves over local and global fields by providing data which, among other things, helps to understand their Galois representations, the torsion subgroups of their Jacobians, and analogues of the Lang-Trotter conjecture. (Received August 28, 2018)