Constructing genus 2 curves over finite fields.
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We present an algorithm for constructing genus 2 curves over a finite field with a given number of points on its Jacobian. This has important applications in cryptography, where groups of prime order are used as the basis for discrete-log based cryptosystems. For a quartic CM field $K$ with primitive CM type, we compute the Igusa class polynomials modulo $p$ for certain small primes $p$ and then use the Chinese remainder theorem and a bound on the denominators to construct the class polynomials. We will also discuss some improvements to this.