

The maximum number of points on a curve of genus 4 over F_8 is 25

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Abstract. Let $N_q(g)$ be the maximum number of points on a curve of genus g over the finite field F_q . We will explain our proof that $N_8(4) = 25$; this was essentially the smallest unknown value of $N_q(g)$. It results from work of Kristin Lauter that it suffices to show that there is no curve of genus 4 over F_8 with 27 points.

There are, of course, only finitely many curves of any given genus over a given finite field, and so our strategy involves reducing the quantity of curves which need to be considered to a tractable number (a few billion), and using a computer to count the points on these curves. The reduction involves studying the combinatorics relating to automorphisms of quadric surfaces in P^3 .

This might also be appropriate for the arithmetic geometry session, if one session is more full than the other.

