

# Poonen's "Bertini Theorems over Finite Fields"

Jeroen Demeyer

## Abstract

Consider the projective space over a finite field  $\mathbb{F}_q$ . A hypersurface is a variety defined by one homogenous equation with coefficients in  $\mathbb{F}_q$ . For  $d$  going to infinity, we give a formula for the probability that a hypersurface of degree  $d$  is nonsingular. We explore the proof only for the two-dimensional case, but it can easily be extended to higher dimensions.

This is a special case of the results in Poonen's paper "Bertini Theorems over Finite Fields". Poonen uses the full power of algebraic geometry, whereas our exposition is only based on elementary facts.

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Universiteit Gent

Zuivere Wiskunde en Computeralgebra

Galglaan 2 (Building S22)

9000 Gent

Room 14