Estimates for polynomial systems defining irreducible smooth complete intersections

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In this talk we shall consider algebraic varieties defined as the set of zeros of a "typical" sequence of multivariate polynomials over a finite field. We shall consider varios types of "nice" varieties: set-theoretic and ideal-theoretic complete intersections, absolutely irreducible one, and nonsingular ones. For these types, we shall present a nonzero "obstruction" polynomial of bounded degree in the coefficients of the sequence that vanishes if its variety is not of the type. This in particular yields bounds on the number of such sequences. Further, we shall show that most sequences (of at least two polynomials) define a degenerate variety, namely an absolutely irreducible nonsingular hypersurface in some linear projective subspace.

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