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The Polynomial Method and the Finite-Field Kakeya Problem

Abstract for the Combinatorics Seminar 2017 March 21

A finite-field Kakeya set is a subset of $(F_q)^n$ (the n-dimensional vector space over a finite field of order q) which contains a line in each direction. I will first show how to use polynomials to obtain bounds on the size of a Kakeya set in finite vector spaces. Then I will show how to modify this polynomial technique to obtain better bounds on the size of these Kakeya sets. Time permitting, I will discuss bounds on related incidence problems.