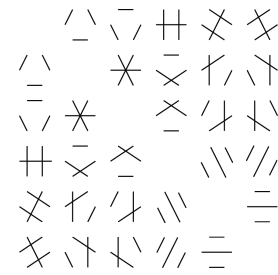


Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

Hyperovals, Cyclotomic Sets, and their relations in $AG(2,q)$

Philip DeOrsey
University of Colorado, Denver

In a projective plane of order $q = 2^e$, a hyperoval is a maximal set of points no three of which are collinear. The search for, and classification of, hyperovals has been an active research area for many years. The most common way to represent hyperovals is with an o -polynomial in $PG(2,q)$. We will discuss a new representation of hyperovals in $AG(2,q)$, when the points of $AG(2,q)$ are viewed as elements of $GF(q^2)$. We call this representation a ρ -polynomial.

Due to the structure of ρ -polynomials we can show that the range can be partitioned into cyclotomic sets of the form

$$C_{\beta,r} = \{\beta, \beta^r, \dots, \beta^{r^{m-1}}\}$$

where β is a field element, and $r = 2^k$ is an automorphism of the field. We will discuss the ρ -polynomial representation in detail, and how cyclotomic sets may allow us to push the search for hyperovals into higher order planes.

Strongly regular graphs from large arcs in affine planes

Tim Penttila
Colorado State University

Tits constructed generalized quadrangles from ovals in Desarguesian projective planes in 1968; Ahrens-Szekeres and Hall constructed generalized quadrangles from hyperovals in Desarguesian planes in 1969 and 1971. Payne constructed generalized quadrangles from q -arcs in Desarguesian planes of order q in 1972 and 1985. All of these generalized quadrangles have strongly regular concurrency graphs. Without the hypothesis that the planes be Desarguesian, we construct graphs with the same parameters.

This is joint work with Elizabeth Lane-Harvard and Stanley E. Payne.

Weber 223
4–6 pm
Friday, May 9, 2014
(Refreshments in Weber 117, 3:30–4 pm)
Colorado State University

This is a joint Denver U / UC Boulder / UC Denver / U of Wyoming / CSU seminar that meets biweekly.
Anyone interested is welcome to join us at a local restaurant for dinner after the talks.



Department of Mathematics
Fort Collins, Colorado 80523