Mathematics Seminar

Rocky Mountain Algebraic Combinatorics Seminar

The MacWilliams Extension Theorem for Poset Weights

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Unibversity of Kentucky

This talk belongs to the area of algebraic coding theory. Codes of length n are subspaces of a vector space F^n endowed with a weight function and where F is a finite field. The best studied weight is the Hamming weight, but in certain contexts also other weights arise. The MacWilliams extension theorem aims at describing isometries, that is, weight-preserving isomorphisms, between codes of the same length. The best situation arises when each such isometry extends to an isometry of the ambient space F^n because the latter are often easy to describe.

In this talk we will study the topic for poset weights and show that the extension property holds true if and only if the poset is hierarchical. The statement is also true when we replace the finite field by a finite Frobenius ring, and the result thus belongs to the area of ring-linear coding.

A Classification of Hyperfocused 12-arcs

Phil DeOrsey
University of Colorado, Denver

A k-arc in PG(2,q) is a set of k points no three of which are collinear. A hyperfocused k-arc is a k-arc in which the $\binom{k}{2}$ secants meet some external line in exactly $k-1$ points. Hyperfocused arcs can be used to create secret sharing schemes as introduced by Simmons in 1990. A technique of viewing hyperfocused arcs as 1-factorizations of the complete graph K_n that embed in PG$(2, q)$ was introduced by Cherowitzo and Holder in 2005. We study the 526,915,620 1-factorizations of K_{12}, determine which are embeddable in PG(2,q), and classify hyperfocused 12-arcs.

Weber 223
4–6 pm
Friday, April 24, 2015
(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.

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