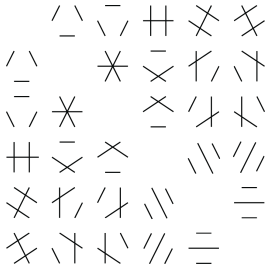
Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

Multisets of Values of Functions over Finite Fields

Eric Moorhouse
University of Wyoming

Let F be a finite field of order q. Given a q-multiset S of values in F, in general there are many choices of function $F \to F$ having S as its multiset of values. The question arises: what is the smallest degree of any polynomial in $F[t]$ realizing S as its multiset of values? I will say what I know about this problem (which is less than I would like!).

Among the first difficult cases is the following: Fix a, b in F with $b \neq 0$. Let S consist of a with multiplicity $q-2$, and $a \pm b$ as the remaining two values in S. Then any polynomial in $F[x]$ realizing S has degree $q-2$. Is the converse true?

This problem may be reformulated as follows: Let $f : F \to F$ be any function satisfying $\sum_{a \in F} \sigma(a) f(a) \neq 0$ for every permutation σ of F. Show that f is constant on a set of size $q-2$.

If time permits, I might say something about the original geometric motivation for considering such problems.

Representing finite lattices as congruence lattices of finite algebras

William DeMeo
University of Colorado, Boulder

We discuss various aspects of the longstanding open problem of representing a finite lattice either as the congruence lattice of a finite algebra, or as an interval in the subgroup lattice of a finite group. We explore constructive methods that yield concrete representations, as well as some nonconstructive ways to prove existence of a representation. We also give a brief demo of the computer programs—GAP and UACalc—that we use to search for representations of finite lattices. A combination of these methods has enabled us to prove that every lattice with at most seven elements, with only one possible exception, is representable as a congruence lattice of a finite algebra. This is joint work with Ralph Freese (U Hawaii) and Peter Jipsen (Chapman U).

Weber 223
4–6 pm
Friday, October 20, 2017
(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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