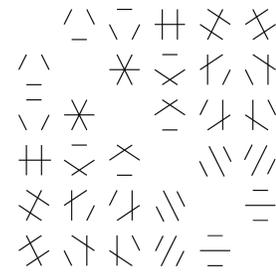


Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

Q-polynomial association schemes with at most 5 classes.

Jason Williford
University of Wyoming

An association scheme can be thought of as a combinatorial generalization of a finite transitive permutation group, where the notion of global symmetry is replaced by certain local symmetry conditions. The definition of association scheme is due to Bose and Shimamoto in 1939, in the context of the design of experiments. Since then it has found connections to coding theory, group theory, and finite geometry.

In the 1973 thesis of Philippe Delsarte, the author identified two special classes of association schemes: the so-called P -polynomial and Q -polynomial schemes. The schemes that are P -polynomial are precisely those generated by a distance-regular graph, in which Delsarte gave natural analogues to coding theory. Similarly, Delsarte gave a natural analogue to design theory in Q -polynomial schemes.

However, Q -polynomial schemes have no analogous combinatorial definition. Consequently, much less is known about them than their P -polynomial counterparts. In this talk, we will discuss what is known about primitive 3-class Q -polynomial schemes, and imprimitive Q -polynomial schemes with at most 5 classes. We will also present new tables of parameter sets summarizing known constructions, non-existence results and open cases.

Cubic Surfaces over a Finite Field

Anton Betten
CSU

Classifying cubic surfaces over the complex numbers was one of the highlights of nineteenth century mathematics. The geometry is beautiful, with 27 lines contained in each surface. In this talk, we will consider the problem of classifying cubic surfaces over small finite fields. There seems to be strong opinions about how this should be done. Manin in 1974 asks the rhetorical question: "What use is it to know, for instance, the number of coplanar triples of lines or the number of double Schlaefli sixfolds?" We will discuss practical algorithms to classify cubic surfaces via their Schlaefli double sixes and via their tritangent planes.

Weber 223
4–6 pm
Friday, April 7, 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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