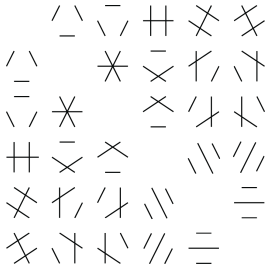
Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

The rigidity of periodic frameworks

Elissa Ross
Worcester Polytechnic Institute, and Mesh Consultants (Fields Institute)

Rigidity theory investigates the flexibility of structures which are defined by geometric constraints (fixed lengths, fixed areas, fixed directions, etc.) on a set of rigid objects (points, lines, planes, polygons, etc.). Since the rigidity properties of a structure — either man-made, such as a building or mechanical linkage, or found in nature, such as a biomolecule, protein or crystal — are critical to its form and function, rigidity theory has many practical applications. One such connection is to materials science. Zeolites are a type of mineral with a repetitive sieve-like molecular structure where the "holes" of the sieve expand and contract. Using this as motivation, we study the rigidity properties of infinite periodic frameworks. We think of such a framework as a graph embedded on an n-dimensional torus, and we study its rigidity properties through the consideration of its combinatorial, geometric and topological attributes. In this talk we give a general introduction to rigidity theory for both finite and infinite periodic graphs, and outline a selection of related problems and applications.

The Exact Cover Problem in Finite Geometry

Anton Betten
Colorado State University

We will discuss the problem of classifying combinatorial objects, in particular those in finite geometry.

One of the main tools to facilitate this is a reduction to a problem known as "Exact Cover" in computer science.

We will see how this fits into a general program to classify combinatorial objects by computer. Plenty of examples illustrating the method will be shared.

Weber 223
4–6 pm
Friday, September 26, 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.

Colorado State University

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