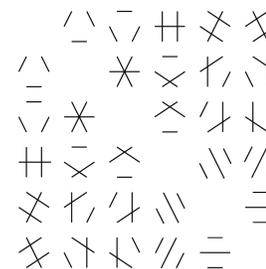


# Mathematics Seminar



## Rocky Mountain Algebraic Combinatorics Seminar

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### Computing canonical forms of graphs: limitations of lexicographic methods

Takunari Miyazaki  
Trinity College, Hartford, CT

Determining the computational complexity of the problem of finding canonical representatives of graphs is a long-standing unresolved question. This question is of fundamental interest in the theory of computing because of its close relationship with graph-isomorphism testing.

While the problem may be difficult in general, group-theoretic methods have enabled polynomial-time solutions for important classes of graphs, including graphs of bounded valence. In practice, however, variants of backtrack search to find lexicographic leaders have long been accepted as quite effective; for example, the system nauty is the leader in this category.

In this talk, I will discuss theoretical limitations of the lexicographic-leader approach to finding canonical forms. It turns out that this approach leads to NP-complete problems, even for very restricted classes of graphs for which there are simple polynomial-time solutions by group-theoretic methods.

### Semifinite Generalized Quadrangles

Eric Moorhouse  
University of Wyoming

A generalized quadrangle with  $k$  points per line ( $k$  finite), but infinitely many points and lines altogether, is called semifinite. The question of existence of such structures is a long-standing open question. The combined work of Kantor, Cameron and Brouwer ruled out the cases  $k = 3, 4$ ; and the case  $k = 5$  was ruled out by Cherlin (2005) using model-theoretic techniques. I will outline Cherlin's argument and offer some variants of his approach. The hope (currently unrealized) is to extend this approach to  $k = 6$  or larger.

Weber 223  
4–6 pm  
Friday, October 10, 2014  
(Refreshments in Weber 117, 3:30–4 pm)  
Colorado State University

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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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