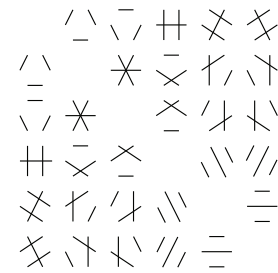


Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

Quasigroups, manifolds, and the completion of partial Latin hypercubes

Charlotte Aten
University of Denver

In my recent work with Semin Yoo, we produced a generalization of a construction of Herman and Pakianathan which assigns to each finite noncommutative group a closed surface in a functorial manner. While Herman and Pakianathan built 2-manifolds from groups, we build n -manifolds from n -quasigroups, the n -ary analogue of quasigroups. I will give examples of these constructions, show some pictures, and indicate how all homeomorphism classes of triangulable orientable manifolds arise from this construction. We will see that a natural question about building compact manifolds is equivalent to a completion problem for Latin hypercubes, the $n = 2$ case of which is the Evans Conjecture.

Local pseudo-randomness and discrete curvature

Paul Horn
University of Denver

Eigenvalues and eigenvectors of matrices associated with graphs give a rich window into their structure. Among the many important properties that eigenvalues certify is how the 'random like' the distribution of the edges is. In recent years, inspired my analogies between graphs and Riemannian manifolds – highlighted by the relationship between the Laplacian matrix of a graph, and the Laplace-Beltrami operator of manifolds – there has been significant effort into defining notions of curvature for graphs. Graph curvature gives a 'local' way of understanding 'global' graph properties, and many of these properties are similar to those understandable via eigenvalues. In this talk, I'll discuss some of these notions of curvature, and show how they certify something about how randomly neighborhoods of vertices are stitched together. I'll also try to briefly mention some related questions and results on strongly regular graphs, so hopefully the talk won't be completely out of place in an algebraic combinatorics seminar.

Weber 223
4–6 pm, Friday, February 9, 2024
(Refreshments 3:30–4 pm)
Colorado State University
4 pm, Friday, February 9, 2024

This is a joint Denver U / UC Boulder / 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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