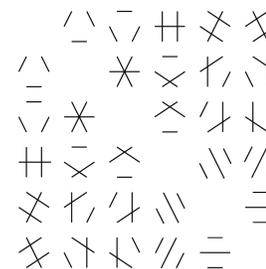


# Mathematics Seminar



## Rocky Mountain Algebraic Combinatorics Seminar

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### Determining solvability of groups of homeomorphisms

Susan Hermiller  
University of Nebraska

The group  $PL_+(I)$  of orientation-preserving piecewise-linear homeomorphisms of the unit interval includes many important subgroups, most notably R. Thompson's group  $F$ . For any finitely generated subgroup  $H$  of  $G$ , we use dynamical properties of the generating homeomorphisms to show that the derived length of  $H$  is bounded above by the number of  $H$ -orbit classes of the breakpoints of the generators. Applying this result to 'computable' subgroups of  $G$  (including  $F$ ), we give an algorithm which determines whether or not any given finite subset of such a computable group generates a solvable group. We give an application of this to solving the subgroup membership problem for a large family of finitely generated solvable subgroups of finitely generated groups of  $PL$  homeomorphisms. This is joint work with Collin Bleak and Tara Brough.

### The representation theory of combinatorial random walks

Nathaniel Thiem  
University of Colorado, Boulder

One useful application of character theory is in studying mixing times of random walks on groups. The notion of a supercharacter theory encourages a further refinement of techniques in this application; in particular, it gives a spectrum of options that allow tailoring the theory to meet the needs of the underlying walk. This talk focuses on induced random walks on combinatorial objects that arise from set partitions on groups. We explore what properties of set partitions give desirable behaviors and how to use resulting representation theories to compute eigenvalues and eigenvectors for the walk. This project is joint with a multitude of REU students.

Weber 223  
4–6 pm  
Friday, Apr 6, 2018  
(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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