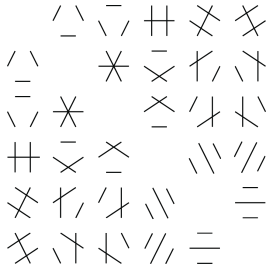
Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

Graph Traversal Edit Distance

Hamidreza Chitsaz
Colorado State University (CS)

Many problems in applied machine learning deal with graphs (also called networks), including social networks, security, web data mining, protein function prediction, and genome informatics. The kernel paradigm beautifully decouples the learning algorithm from the underlying geometric space, which renders graph kernels important for the aforementioned applications.

In this talk, we give a new graph kernel which we call graph traversal edit distance (GTED). We introduce the GTED problem and give the first polynomial time algorithm for it. Informally, the graph traversal edit distance is the minimum edit distance between two strings formed by the edge labels of respective Eulerian traversals of the two graphs. Also, GTED is motivated by and provides the first mathematical formalism for sequence co-assembly and de novo variation detection in bioinformatics.

We demonstrate that GTED admits a polynomial time algorithm using a linear program (LP) in the graph product space. We prove the LP is unimodular; hence, it is guaranteed to yield an integer solution. Our proof is based on the homology of graph product spaces. In particular, we show that the homology groups of graph product spaces are torsion free. A result of Dey-Hirani-Krishnamoorthy then gives the result.

Semi-extraspecial Groups

Mark Lewis
Kent State University

Extraspecial groups play an important role in group theory. Particularly in problems involving character degrees. We will show how how extraspecial groups can be generalized to semi-extraspecial groups. We will present some of the the basic results regarding semi-extraspecial groups. Then we focus on semi-extraspecial groups that have an abelian subgroup of maximal possible order and consider a connection with semifields.

Weber 223
4–6 pm
Friday, February 16, 2018
(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

Department of Mathematics
Fort Collins, Colorado 80523