



Mathematical Sciences Spring 2024 Colloquium Series



Dr. Alex McDonough

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Friday, April 12 at 3:00pm
Bell Hall 130 and online via Zoom
Scan the QR-code to access the link

A Hidden Structure of Spanning Trees

Abstract

Let S be the set of *spanning trees* of a given graph that is embedded in a plane. Mathematicians have long been interested in calculating the *cardinality* of S (a statistic that is sometimes called the *complexity* of the graph). However, there is more to explore about S than just its cardinality! This talk will focus on a concrete construction based on the *rotor-routing algorithm*. This construction gives S a group-like structure (which algebraists call a *torsor*, *heap*, or *principal homogenous space*). Remarkably, this structure is not only natural to describe, but also in some sense *unique*. My primary goal of the talk is to teach you how to divide one spanning tree by another, and then use this result to transform other spanning trees. My secondary goal is to share joint work with Ganguly, where we make precise and prove the uniqueness claim in the previous paragraph. If there is time, I will end the talk by discussing an ongoing project with Ding, Tóthmérész, and Yuen where we partially generalize the construction to arbitrary *ribbon graphs* and *oriented regular matroids*.

Host: Dr. Art Duval (adual@utep.edu)

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu

