



The rising STAR of Texas

Discrete Mathematics Seminar

Time: Friday, March 24, 2017, 2:15-3:15 PM
Room: 237 Derrick Hall
Title: Parking functions, subset chip-firing, and syzygies of monomial ideals
Speaker: Dr. Anton Dochtermann, Department of Mathematics

Abstract:

For any graph G , the G -Parking functions are a collection of sequences with connections to many combinatorial objects including spanning trees, hyperplane arrangements, and invariant theory. Postnikov and Shapiro introduced a monomial ideal M_G whose standard monomials are given by the parking functions of G . They studied connections to power ideals and other deformations of 'monotone monomial ideals', and constructed minimal resolutions for certain classes. Minimal resolutions of M_G for arbitrary G were later described by Dochtermann and Sanyal.

The ideals M_G are also strongly related to 'chip-firing' on the graph G , a dynamical system on the vertices of G governed by the Laplacian matrix. Motivated by these notions we study certain 'skeleta' of the ideals M_G and (for the case of the 1-skeleta) we construct minimal resolutions and describe monomial bases. Perhaps surprisingly these constructions involve tropical hyperplanes and the 'signless' Laplacian.