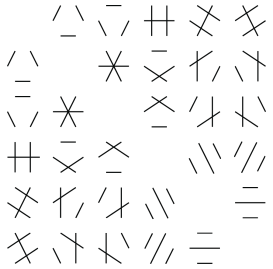
Mathematics Seminar



Rocky Mountain Algebraic Combinatorics Seminar

From Affine Weyl Groups to Discrete Painlevé Equations

Anton Dzhamay
University of Northern Colorado

The goal of this talk is to partially outline the role played by the affine Weyl groups in the theory of discrete Painlevé equations, using a discrete Painlevé equation known as q-PVI or q-P($A_3^{(1)}$) as an example. This is a particular two-dimensional nonlinear recurrence relation that defines a birational map from C^2 to itself. This map lifts to an isomorphism of a certain rational algebraic surface X, known as the Okamoto space of initial conditions, that is constructed from C^2 using a sequence of blowups resolving the indeterminacies of the map. This surface is characterized by a certain sub lattice of affine type A_3 in the Picard lattice. The complementary symmetry sub-lattice is given by the affine Dynkin diagram D_5. Reflections in the roots of this sub-lattice generate elementary birational automorphisms of X, which, combined with the automorphisms of the Dynkin diagram, generate the extended affine Weyl symmetry group of the surface. It turns out that the original discrete dynamics corresponds to a translation in this symmetry sub-lattice, and the representation of the translation vector as a composition of elementary reflections and automorphisms allows us to recover back the coordinate description of our equation. The main objective of the talk would be to explain this inverse process.

Graphs with Integral Spectrum

Anton Betten
Colorado State University

The spectrum of a graph is the set of eigenvalues of the adjacency matrix of the graph, together with their multiplicities. In 1974, Harary and Schwenk initiate the study of graphs with integral spectra, that is, graphs whose eigenvalues are all integral.

In this talk, we will look at a lot of examples of graphs, many of which are indeed integral. We will discuss some of the methods for classifying integral graphs in certain cases. Finally, we will look at integral Cayley graphs.

Weber 223
4–6 pm
Friday, February 20, 2015
(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