

Combinatorial Structures in Algebra, Geometry and Topology

International Workshop
October 31st, 2016

All talks are taking place in *MZH 7200*.

10:30–11:00 Dmitry Feichtner-Kozlov

The first Cheeger constant of a simplex

In this talk we show that the first Cheeger constant of a simplex with n vertices is equal to $n/3$ whenever n is not a power of 2. We also show that when n is a power of 2, the first Cheeger constant is equal to $n/3 + O(1/n)$. This extends the previous results of Meshulam and Wallach.

11:15–11:45 Masahiko Yoshinaga

What makes roots lying on a line?

Postnikov and Stanley (J. Comb. Th. Ser A, 2000) conjectured that all roots of the characteristic polynomial of the Linial arrangement (associated to an irreducible root system) have the same real part. This conjecture was verified for root systems of type ABCD by Postnikov, Stanley and Athanasiadis. I will discuss recent progress on the conjecture.

11:45–12:15 Pauline Bailet

Aomoto complexes and monodromy of Milnor fibers of hyperplane arrangements

We will talk about local system cohomology of hyperplane arrangements complements, cohomology of Milnor fibers and monodromy. In particular, we will study a graph which is determined by the arrangement's combinatorics. It has been conjectured by Salvetti and Serventi that the connectivity of this graph implies the triviality of the monodromy on the Milnor fiber for a complex line arrangement. We will discuss some particular cases and a generalization of this graph with finite field coefficients.

— Lunch Break —

14:00–14:30 Eva-Maria Feichtner

A Leray model for Orlik-Solomon algebras

Although hyperplane arrangement complements are rationally formal, we note that they have non-minimal rational (CDGA) models which are topologically and combinatorially significant. We construct a family of CDGAs which interpolates between the Orlik-Solomon algebra and the cohomology algebras of arrangement compactifications. Our construction is combinatorial and extends to all matroids, regardless of their (complex) realizability.

This is joint work with Christin Bibby and Graham Denham.

14:45–15:15 Christoph Pegel

A Conjecture on Intermediate Marked Poset Polytopes

We quickly review poset polytopes, Gelfand–Tsetlin and Feigin–Fourier–Littelmann–Vinberg polytopes, as well as their common generalization as marked poset polytopes. We then introduce intermediate marked poset polytopes with the goal in mind to use them to study the face structure of marked chain polytopes. We present a "tropical" subdivision of marked poset polytopes that conjecturally yields a vertex description of the intermediate polytopes.