Algebraic Varieties with Group Actions
Variétés algébriques avec actions de groupes
(Org: **Jaydeep Chipalkatti** (Manitoba))

MEGUMI HARADA, McMaster University, Department of Mathematics and Statistics, 1280 Main Street West, Hamilton, Ontario, L8S 4K1

An introduction to the topology of symplectic quotients

This talk will be an overview of modern symplectic-geometric techniques which compute the topology of symplectic quotients. There are many parallels with the algebraic-geometric theory of GIT (Geometric Invariant Theory) quotients, and I will mention these as time allows. First, I will give a very brief account of the construction of symplectic quotients, starting from the data of a Hamiltonian compact group action on a symplectic manifold. I will then review the pioneering work of Kirwan, as well as that of her collaborators and followers (Jeffrey–Kirwan, Tolman–Weitsman, Goldin, to name a few) which allows us to compute the cohomology of these symplectic quotients using equivariant techniques "upstairs" on the original Hamiltonian space. The original work in this area uses rational Borel-equivariant cohomology. Time permitting, I will mention my recent work with collaborator Greg Landweber which generalizes this "Kirwan package" to the case of integral topological K-theory, thus incorporating torsion considerations.

COLIN INGALLS, University of New Brunswick, Fredericton, NB, E3B 5A3

Central extensions of finite subgroups of $\mathrm{GL}\,2$

We link the classification of two dimensional tame orders by Reiten and Van den Bergh using AR quivers to the classification of M. Artin with ramification data by using a third classification: Central extensions of finite subgroups of $\mathrm{GL}\,2$. This third classification also classifies local smooth Deligne–Mumford stacks of dimension two with cyclic generic stabilizer.

KIUMARS KAVEH, Dept. of Math., Univ. of Toronto, 40 St. George St., M5S 2E4

String polytopes, G–C polytopes and geometry of flag and spherical varieties

The classical results in toric geometry (e.g. results of Bernstein, Kushnirenko and Khovanskii) relate the geometry/topology of a toric variety and the complete intersections inside it to the combinatorics of the associated Newton polytopes. In this talk we show how one can obtain the same results for the flag variety and the string polytopes.

More specifically we give formula for the intersection numbers of divisors, (arithmetic and geometric) genus of complete intersections as well as the Euler char. of a complete intersection in the flag variety, in terms of the number of integral points and the volume of the corresponding polytopes. The formula for the intersection numbers of divisors is due to Brion–Alexeev. These results (partially) generalize to the bigger class of spherical varieties.

This is joint work with A. G. Khovanskii.

String polytopes are the generalization of the classical Gelfand–Cetlin polytopes assocaited to an irreducible representation of $\mathrm{GL}(n, C)$, to any reductive group.

JOCHEN KUTTLER, University of Alberta

On the Luna stratification of quotients

If X is an affine variety on which a reductive group G acts, the invariant theoretic quotient $X//G$ admits a finite stratification by stabilizer subgroups. A natural questions is, whether this stratification is connected to the geometry of $X//G$, e.g. whether

it is preserved by any automorphism of $X//G$. We study this question for interesting families of representations of G, giving an affirmative answer for example in the case of more than three copies of the adjoint representation.

This is joint work with Zinovy Reichstein.

HUGH THOMAS, University of New Brunswick, Fredericton, NB, E3B 5A3

(Co)minuscule Schubert calculus

I will discuss a root system uniform, concise combinatorial rule for Schubert calculus of minuscule and cominuscule flag varieties G/P, generalizing Schützenberger's jeu de taquin formulation of Schubert calculus in type A. I will spend some time discussing the underlying tableau combinatorics of cominuscule dual equivalence, which extends a concept introduced by Haiman. I will also give a conjecture for K-theory in the minuscule types.

This is all joint work with Alex Yong.

MATTHIEU WILLEMS, University of Toronto, Department of Mathematics, 100 St George Street, Toronto, Ontario, Canada, M4S 2E4

A Chevalley formula in Equivariant K-theory

In this talk, I will give a Chevalley formula in equivariant K-theory. First, I will decompose the class of a line bundle in the equivariant K-theory of a Bott–Samelson variety. Then I will use this result to give a formula to multiply the class of a line bundle by the class of a Schubert variety in the equivariant K-theory of a flag variety.