

Abstracts.
FRG Workshop 5, Texas A&M University.
January 14-17, 2016

January 14:

Martha Precup.

Title: Hessenberg Varieties

Abstract: Hessenberg varieties are subvarieties of the flag variety which depend on two parameters, an element of the Lie algebra and a Hessenberg space. In this talk, I'll define these varieties and discuss the methods one can use to study their geometry. Along the way, I'll give a survey of known results and open questions.

Alexei Oblomkov.

Title: Hessenberg varieties and related representation theory.

Abstract: Hessenberg varieties were introduced in work of Lusztig, De Conicini and Procesi.

They generalize well-known Springer varieties and share many features of Springer varieties.

For example, there is action of interesting algebra on its homology (due to Grinberg) and its homology carry very important information about the representation theory of p -adic groups (due to Waldruhen, Goresky, MacPherson, Kottwitz). In talk(s) I will start with examples, explain how well known geometric objects like elliptic curves and Kummer K3 appear as Hessenberg varieties. In the small examples I will explain how the above mentioned structure of geometric representation theory appear.

Colleen Robles.

Title: Study of VHS via characteristic varieties

Abstract: It seems that there may be a program to study variations of Hodge structure via the characteristic varieties introduced by Sheng and Zuo. I will explain why I think this may be the case, and some of the problems that we might be able to tackle. As evidence for the proposed program's viability I will show how characteristic varieties may be used to characterize the families of Calabi-Yau manifolds that solve Gross's geometric realization problem for Hermitian symmetric domains.

Matt Kerr.

Title: TBA

Abstract: TBA.

January 15:

Patrick Brosnan.

Title: The Shareshian-Wachs conjecture on Hessenberg Varieties

Abstract: Tim Chow and I recently proved a conjecture of Shareshian and Wachs, which relates a certain action of the symmetric group defined by Tymoczko on the cohomology of Hessenberg varieties (in type A) to a certain formal power series called the chromatic symmetric function introduced by Stanley. I'll try to explain what all these words mean, and sketch our proof of the conjecture.

James Lewis.

Title: The Business of Height Pairings

Abstract: Beilinson and Bloch independently constructed height pairing on arithmetic varieties, and one presumes they are the same. We extend these ideas to a similar pairing on a Bloch Beilinson filtration of Chow groups. The central theme here is that the generalized height pairing serves as a polarization on graded pieces of the Bloch-Beilinson filtration, analogous to polarized Hodge structures. This is joint work with Souvik Goswami.

Zheng Zhang.

Title.

Abstract.

January 16.

Kevin Kordek.

Title: Torelli groups and finite covers of the moduli space of hyperelliptic curves

Abstract: The Torelli group of a closed orientable surface is the subgroup of the mapping class group that acts trivially on the first integral homology of the surface. The Torelli groups, and certain subgroups known as hyperelliptic Torelli groups, are popular objects of study in geometric group theory. It turns out that the finiteness properties of these groups are closely related to the topological properties of a certain infinite sequence of finite covers of the moduli space of hyperelliptic curves. I will explain this connection and report on new results concerning the structure of the hyperelliptic Torelli groups.

Alexei Olbomkov.

Title.

Abstract.
