

Spring Meeting on Algebraic Geometry
School of Mathematics, IPM
Saturday 8 - Thursday 13, April 2017

Titles and Abstracts

Omran Ahmadi

M-sequences and some conjectures on exponential sums

Abstract: Studying m -sequences has led to some conjectures on exponential sums over finite fields of characteristic two. In this talk we present some results towards the resolution of these conjectures using number theoretic and algebro-geometric tools.

Sjoerd Beentjes

Crepant resolutions and Donaldson-Thomas invariants

Abstract: The crepant resolution conjecture is a conjecture in enumerative geometry originating from string theory. It relates the Donaldson-Thomas invariants of a certain type of three-dimensional Calabi-Yau orbifold to those of a particular crepant resolution of its coarse moduli space. In this talk, we will explain the statement of this conjecture, and use derived categories and Joyce's motivic Hall algebra to study it.

Roya Beheshti

Moduli spaces of rational curves on Fano hypersurfaces

Abstract: I will talk about the geometry of moduli spaces of rational curves and stable maps on hypersurfaces, and explain some results concerning their dimension, irreducible components, and Kodaira dimension.

Shahram Biglari

On algebraic cycles on abelian varieties

Abstract:

Amael Broustet

On varieties admitting an endomorphism

Abstract: We will discuss the geometry of projective complex varieties admitting a non-invertible endomorphism. More specifically we will show that their singularities are bounded and that in the case of surfaces, they are of log-Calabi-Yau type. This talk is based on joint works with A. Horing and Y. Gongyo.

Alessandro Chiodo

Néron models and genus-one double ramification cycles via Picard functors

Abstract: Néron models of Jacobians are naturally described via Picard functors. Over a discrete valuation ring, this can be obtained by Raynaud's theorem via a quotient of the non-separated Picard functor. We can also present a direct approach within the separated functor Pic^0 of twisted curves. Recently Holmes extended Raynaud's approach on a base scheme of dimension greater than one and was able to provide in this way a universal Néron model over moduli of curves. This construction admits several applications (e.g. the study of limit linear series by Biesel and Holmes). It also allows a new definition of the Double Ramification locus (DR) parametrizing curves equipped with a principal divisor. In collaboration with Holmes, we compute this cycle in genus one and match the formula of Janda, Pandharipande, Pixton and Zvonkine.

Kento Fujita

Uniform K-stability and plt blowups of log Fano pairs

Abstract: We show relationships between uniform K-stability and plt blowups of log Fano pairs.

Frédéric Mangolte

Fake real planes: exotic affine algebraic models of \mathbb{R}^2

Abstract: We study topologically minimal complexifications of the Euclidean affine plane \mathbb{R}^2 up to isomorphism and up to birational diffeomorphism. A fake real plane is a smooth geometrically integral surface S defined over \mathbb{R} such that:

- The real locus $S(\mathbb{R})$ is diffeomorphic to \mathbb{R}^2 ;
- The complex surface $S(\mathbb{C})$ has the rational homology type of $\mathbb{A}_{\mathbb{C}}^2$;
- S is not isomorphic to $\mathbb{A}_{\mathbb{R}}^2$ as surfaces defined over \mathbb{R} .

The analogous study in the compact case, that is the classification of complexifications of the real projective plane $\mathbb{P}_{\mathbb{R}}^2$ with the rational homology

of the complex projective plane is well known: $\mathbb{A}_{\mathbb{C}}^2$ is the only one. We prove that fake real planes exist by giving many examples and we tackle the question: does there exist fake planes S such that $S(\mathbb{R})$ is not birationally diffeomorphic to $\mathbb{A}_{\mathbb{R}}^2(\mathbb{R})$? (Joint work with Adrien Dubouloz.)

Laurent Manivel

Title: New constructions of varieties with trivial canonical bundle

Abstract: I will explain how to construct new interesting varieties, for example Fano or Calabi-Yau, as generalized degeneracy loci. Their universal models will be orbit closures of algebraic groups in prehomogeneous spaces.

Yuri Prokhorov

Title: Smoothings of log canonical surface singularities and applications

Abstract: We discuss necessary and sufficient conditions for existence of \mathbb{Q} -Gorenstein smoothings of log canonical surface singularities. As an application we classify del Pezzo surfaces of Picard number one with log canonical singularities admitting \mathbb{Q} -Gorenstein smoothings.

Iman Setayesh

The product rule in the kappa ring of $\mathcal{M}_{g,n}^{ct}$.

Abstract: In this talk I will describe explicit formulas for the product rule in the kappa ring of the moduli space of curves of compact type.

Short course

There will be a short course by **Grégory Ginot** which runs parallel to the meeting. The title of the short course is

A_{∞} -algebras and algebraic models for 2d-TFT.