School of Mathematical Sciences,East China Normal University

2022 年上海代数几何会议
程序册

华东师范大学闵行校区，上海

2022.12.17-2022.12.18

会议报告人（按姓氏拼音排序）

高云	（上海交通大学）
韩京俊	（上海数学中心）
江辰	（上海数学中心）
李思辰	（华东理工大学）
林胤榜	（同济大学）
孙浩	（上海师范大学）
张子立	（同济大学）
张子宇	（上海科技大学）

组织委员会（按姓氏拼音排序）

杜荣　吕鑫　孟晟　谈胜利　张通

日程安排

12 月 16 日

13:00-19:00 报到注册，地点:宝龙艺悦酒店（尚义路 39 弄 1 号）

12 月 17 日

线下会议地点:宝龙艺悦酒店五楼，银龙厅 地址:上海市闵行区尚义路 39 弄 1 号
腾讯会议 ID: 946 583 590 密码:123456

时间	会议内容	主持人
9:00-9:10	开幕式	
9:10-10:10	江辰(复旦中心): On geometric characterization of weighted hypersurface Fano 3-folds	谈胜利
10:10-10:40	合影、中场休息	
10:40-11:40	孙浩(上海师范):Bogomolov type inequality on fibred threefolds	谈胜利
11:40-14:00	午餐	
14:00-15:00	张子立(同济):Simpson's correspondence and the P=W conjecture	杜荣
15:00-15:20	中场休息	
15:20-16:20	高云(上海交大): On the rank of Hermitian polynomials and orthogonal mappings	孟晟
16:20-17:20	林胤榜(同济): Gaeta resolutions and strange duality over rational surfaces	
18:00-20:00	晚宴	

12 月 18 日

时间	会议内容	主持人
9:00-10:00	韩京俊(复旦中心): On termination of flips and exceptionally non-canonical singularities	吕鑫
10:00-10:10	中场休息	
10:10-11:10	李思辰(华东理工): Kawaguchi-Silverman conjecture on automorphisms of projective threefolds	张通
11:10-12:10	张子宇(上海科技): Semi-continuity in variation of GIT	
12:10-14:00	午餐	

报告摘要

On geometric characterization of weighted hypersurface Fano 3-folds

江辰

上海数学中心

Abstract: Hypersurfaces and complete intersections in weighted projective spaces provide many interesting examples in birational geometry. In particular, many varieties with mild singularities are constructed in this way. On the other hand, a natural problem is to determine whether a given variety is a weighted hypersurface or a weighted complete intersection. In this talk, I will explain how to use the study of explicit geometry of 3-folds to determine whether a given 3-fold with nice geometric/numerical property is a weighted hypersurface (somehow, the slogan is that, if a 3-fold looks like a weighted hypersurface, then it is probably a weighted hypersurface), and discuss the application to the classification of Fano 3-folds.

Bogomolov type inequality on fibred threefolds

孙浩

上海师范大学

Abstract: In this talk, we will give a conjectural construction of stability conditions on the derived category of fibred threefolds. The construction depends on a conjectural Bogomolov type inequality for certain stable complexes. We prove the conjectural Bogomolov type inequalities for ruled threefolds. It gives a type of strong Bogomolov inequality. If time permits, we will discuss some potential applications of the Bogomolov type inequality.

Simpson's correspondence and the P=W conjecture

张子立

同济大学

Abstract: Fix a complex projective curve C and a reductive group G. There are three moduli spaces with the pair (C,G): the character variety M_B, the moduli of flat connections M_dR, and the moduli of Higgs bundles M_Dol. The Simpson's correspondence produces canonical homeomorphisms among the three moduli spaces, and hence identify the cohomology groups of them. The geometric structures of the moduli spaces induce various filtrations in the cohomology groups. De Cataldo-Hausel-Migliorini conjectured in 2012 that the Perverse filtration (P) of M_Dol is identical to the Hodge-theoretic Weight filtration (W) of M_B; the P=W conjecture. We will introduce the background of the Simpson's correspondence and recent progress of the P=W conjecture.

On the rank of Hermitian polynomials and orthogonal mappings

高云

上海交通大学

Abstract: Hilberts 17-th problem asked whether a non-negative polynomial in several real variables must be a sum of squares of rational functions. There is also a quantitative version of Hilberts 17th problem which asks how many squares are needed. D'Angelo extend this problem to more general case which is called Hermitian or complex variable analogues of Hilberts problem. Ebenfelt proposed a conjecture regarding the possible ranks of the Hermitian polynomials, known as the SOS Conjecture, where SOS stands for "sums of squares". In this talk, we will introduce a dimension formula for local holomorphic mappings， which is inspired by an analogous theorem of M. Green for the linear systems in Pn. And we will talk about an orthogonal map between generalized balls, which is the generalization of proper mapping. Combining the dimension formula and orthogonal mapping, we study this conjecture and its generalizations to arbitrary signatures for a Hermition forms on Cn . It is a joint work with Sui-Chung Ng.

Gaeta resolutions and strange duality over rational surfaces

林胤榜

同济大学

Abstract: We will discuss about resolutions of coherent sheaves by line bundles from strong full exceptional sequences over rational surfaces. We call them Gaeta resolutions. We then apply the results towards the study of the moduli space of sheaves, in particular Le Potier's strange duality conjecture. We will show that the strange morphism is injective in some new cases. One of the key steps is to show that certain Quot schemes are finite and reduced. The next key step is to enumerate the length of the finite Quot scheme, by identifying the Quot scheme as the moduli space of limit stable pairs, where we are able to calculate the (virtual) fundamental class. This is based on joint work with Thomas Goller.

On termination of flips and exceptionally non-canonical singularities

韩京俊

上海数学中心

Abstract: In this talk, I will introduce the so-called " exceptionally non-canonical singularities ". Although being noncanonical, such pairs are expected to have nice properties. In particular, it is predicted that the set of minimal log discrepancies (mlds) of exceptional non-canonical pairs should satisfy the ascending chain condition (ACC). I will show the relationship of this conjecture with the termination of flips, and the conjecture holds in dimension 3.

Kawaguchi-Silverman conjecture on automorphisms of projective threefolds

李思辰

华东理工大学

Abstract: Let f be a surjective endomorphism of a normal projective variety X. Kawaguchi-Silverman conjecture predicts that if P is a rational point of X with Zariski dense orbit, then the arithmetic degree of f at P is equal to the dynamical degree of f. In this talk, I'll explain my recent progress towards this conjecture on automorphisms of projective threefolds.

Semi-continuity in variation of GIT

张子宇

上海科技大学

Abstract: We review the classical semi-continuity theorem in geometric invariant theory, and generalize it to the relative case with semi-ample polarizations. The proof relies on two main ingredients, namely continuity of the M-function and finiteness of possible choices of semi-stable loci. The application of semi-continuity in the study of degenerations of Hilbert schemes will also be mentioned. This is based on joint work with Lars Halle and Klaus Hulek.