

玉原数論幾何研究集会 2016

Workshop on arithmetic geometry at Tambara, 2016

2016年6月21日(火)–6月24日(金)

東京大学玉原国際セミナーハウス (群馬県沼田市上発知町玉原高原)

プログラム

6月21日(火)

12:46 上越新幹線 上毛高原駅 集合

14:00 セミナーハウス到着

15:15-16:15 松本雄也(名大多元数理): K3 曲面の自己同型の延長可能性

16:15-16:45 コーヒーブレイク

16:45-17:45 鎌田政人(中大経済): Elliptic fibrations on K3 surfaces related to the Jacobian of genus 2 curves

18:00-20:00 夕食

6月22日(水)

7:30-8:30 朝食

9:00-10:30 谷田川友里(東大数理), 胡昊宇(東大数理・学振): 有限体上の通常 K3 曲面の Tate 予想について

10:30-10:40 コーヒーブレイク

10:40-12:10 谷田川友里(東大数理), 胡昊宇(東大数理・学振): 有限体上の通常 K3 曲面の Tate 予想について

12:30-13:30 昼食

14:30-15:30 小木曾啓示(東大数理): Isomorphic quartic K3 surfaces in the view of Cremona and projective transformations

15:30-16:00 コーヒーブレイク

16:00-17:00 De-Qi Zhang(National University of Singapore): Rationality of homogeneous varieties

18:00-20:00 夕食

6月23日(木)

7:30-8:30 朝食

9:00-10:30 時本一樹(東大数理), 大川幸男(東大数理): 有限体上の超特異 K3 曲面の Tate 予想について

10:30-10:45 コーヒーブレイク

10:45-12:10 時本一樹(東大数理), 大川幸男(東大数理): 有限体上の超特異 K3 曲面の Tate 予想について

12:30-13:30 昼食

野外活動

18:00-20:00 夕食

6月24日(金)

7:30-8:30 朝食

8:45-10:15, 10:30-11:30 松本雄也(名大多元数理): 有限体上の K3 曲面の Tate 予想について

11:45 出発

13:21 上毛高原発 解散

本集会は、科学研究費(A)26247002(代表者 斎藤毅)と東京大学大学院数理科学研究科数物フロンティア・リーディング大学院(FMSP)(申請予定)の援助を受けています。

オーガナイザー：志甫淳，辻雄，斎藤毅

参考文献：

[Nyg83] N. O. Nygaard, The Tate conjecture for ordinary K3 surfaces over finite fields, *Invent. Math.* 74 (1983), no. 2, 213-237.

[Mau14] Davesh Maulik, Supersingular K3 surfaces for large primes, *Duke Math. J.* 163 (2014), no. 13, 2357-2425. With an appendix by Andrew Snowden.

[Cha13] François Charles, The Tate conjecture for K3 surfaces over finite fields, *Invent. Math.* 194 (2013), no. 1, 119-145.

要旨

松本雄也：K3 曲面の自己同型の延長可能性

完備離散付値体上の K3 曲面 X が良い還元をもつ(付値環上の smooth proper model をもつ)とする。 $G \subset \text{Aut}(X)$ がシンプレクティックに作用する馴な有限群のとき、うまい smooth proper model に対し G 作用が延長されることを示す。また、 G がこの条件を満たさない場合の反例を与える。

Masato Kuwata: Elliptic fibrations on K3 surfaces related to the Jacobian of genus 2 curves.

A K3 surface S is said to have a Shioda-Inose structure if S admits an involution fixing the global 2-form on S , such that the quotient is a Kummer surface $\text{Km}(A)$, and provided that the rational quotient map $S \dashrightarrow \text{Km}(A)$ induces a Hodge isometry $T_S(2) \simeq T_{\text{Km}(A)}$ of scaled transcendental lattices. When $A = E_1 \times E_2$ is the product of two elliptic curves, such an S was constructed in two ways by Shioda and Inose, one as a double cover of $\text{Km}(E_1 \times E_2)$, and the other as the quotient of an involution on $\text{Km}(E_1 \times E_2)$. In this talk, we replace $E_1 \times E_2$ by the Jacobian $J(C)$ of a curve C of genus 2, and study some generalizations of the construction of Shioda and Inose. As an application, we construct elliptic K3 surfaces with high Mordell-Weil rank.

Oguiso, Keiji: Isomorphic quartic K3 surfaces in the view of Cremona and projective transformations

We show that there is a pair of smooth complex quartic K3 surfaces S_1 and S_2 in \mathbf{P}^3 such that S_1 and S_2 are isomorphic as abstract varieties but not Cremona isomorphic. We also show, in a geometrically explicit way, that there is a pair of smooth complex quartic K3 surfaces S_1 and S_2 in \mathbf{P}^3 such that S_1 and S_2 are Cremona isomorphic, but not projectively isomorphic. This work is much motivated by several e-mails from Professors Tuyen Truong and János Kollár.

De-Qi Zhang : Rationality of homogeneous varieties

Let G be a connected linear algebraic group over an algebraically closed field k , and let H be a connected closed subgroup of G . We prove that the homogeneous variety G/H is a rational variety over k whenever H is solvable, or when $\dim(G/H) < 11$ and $\text{char}(k) = 0$. When H is of maximal rank in G , we also prove that G/H is rational if the maximal semisimple quotient of G is isogenous to a product of almost-simple groups of type A, type C (when $\text{char}(k) > 2$), or type B_3 or G_2 (when $\text{char}(k) = 0$). This is a joint work with C. Chin.