

NCTS Algebraic Geometry Day, IV
May 19, 2017
National Tsing-Hua University

Jiun-Cheng Chen (NTHU)	10:00-10:50
Jheng-Jie Chen (NCU)	11:00-11:50
Eugene Xia (NCKU)	13:30-14:20
He-Tong Shih (NTU)	14:30-15:20

Title and abstract.

Jiun-Cheng Chen (NTHU)

Title: Singularities and fundamental groups

Abstract:

Fundamental group is an important invariant for a topological space. When X is an algebraic variety, one can also consider its algebraic fundamental group and several local versions of the fundamental group. I will report on some work by Kollár, Kapovich-Kollár and Xu on results related to singularities and fundamental groups. I will discuss some problems I have in mind related to these results.

Jheng-Jie Chen (NCU)

Title: Chern number inequality via a terminal flip and a divisorial contraction to curve in dimension three.

Abstract:

In this talk, we show that the Chern number $c_1(X) \cdot c_2(X)$ increases via a threefold terminal flip and a divisorial contraction to curve by Kollár and Mori's classifications of extremal neighborhoods. This gives the affirmative answers to two Questions by Xie which relate the pseudo-effectiveness of second Chern class $c_2(X)$ for projective 3-folds with nef anti-canonical divisor.

Eugene Xia (NCKU)

Title: Monodromies of moduli spaces of monodromies.

Abstract:

Monodromy is essential for understanding singular fibres of a morphism. We are interested in the moduli spaces of character varieties and their related moduli spaces of Higgs bundles. We will

describe a few integrable connections on these moduli spaces and their monodromies.

He-Tong Shih (NTU)

Title: An application of D-modules: another bridge from algebra to geometry

Abstract:

In the late 1960s, Verma first studied the structure of highest weight modules over finite-dimensional complex semisimple Lie algebras and proposed the problem of determining the characters of general irreducible highest weight modules. It seems to be a purely algebraic problem but the formula was unknown until 1980s. Kazhdan and Lusztig conjectured the explicit form involving in a family of special polynomials. It was proved by Beilinson–Bernstein and Brylinski–Kashiwara through “translating it in languages of various areas of mathematics” which was “astonishing for the specialists who had been studying the problem using purely algebraic means.” In this talk, I will explain how D-module theory relates highest weight modules and Schubert varieties.

Organizers: Jiun-Cheng Chen (NTHU), Jungkai Chen (NTU/NCTS),
Shin-Yao Jow (NTHU)