

柯召先生诞辰 110 周年特别纪念活动

2020 四川大学现代数论及相关领域在线论坛

2020 年 11 月 28 日 — 2020 年 11 月 30 日

Flag manifolds over semifields

鲍焕辰 (新加坡国立大学)

摘要

The study of totally positive matrices, i.e., matrices with positive minors, dates back to 1930s. The theory was generalised by Lusztig to arbitrary split reductive groups using canonical bases, and has significant impacts on the theory of cluster algebras, higher teichmuller theory, etc. In this talk, we survey basics of total positivity and explain its generalization to general semifields. This is based on joint work with Xuhua He.

Affine Deligne-Lusztig varieties and generalized affine Springer fibers

何旭华 (香港中文大学)

摘要

The notion of affine Springer fiber was introduced by Kazhdan and Lusztig in 1988. It plays a crucial role in the geometric representation theory and the Langlands program. The generalized affine Springer fibers were first studied by Kottwitz and Viehmann for the hyperspecial level structure in 2012 and by Lusztig for arbitrary parahoric level structure in 2015. Many geometric properties for the hyperspecial level structure were further studied by Bouthier and Chi.

In this talk, I will propose a new approach to study the generalized affine Springer fibers. The key observation is that the affine Deligne-Lusztig varieties, in some sense, may be regarded as the “shadow” of generalized affine Springer fibers. I will also explain some ingredients used to deduce some geometric properties (nonemptiness, dimension, irreducible components) of generalized affine Springer fibers from the properties of the affine Deligne-Lusztig varieties. This talk is based on a work in progress.

Cycles on arithmetic varieties

刘一峰 (耶鲁大学)

摘要

In this talk, we study algebraic cycles on algebraic varieties over number fields. We introduce a series of conjectures and tools in such study proposed by Beilinson and Bloch. Then we use modular curves and more general Shimura varieties as playground to test these observations. At the end, we will introduce a recent result for unitary Shimura varieties obtained by Chao Li and myself.

Ternary quadratic forms and Goldfeld conjecture

田野 (中国科学院数学与系统科学研究院)

摘要

The Goldfeld conjecture predicts the behavior of analytic rank of elliptic curves in a quadratic twist family. We introduce recent progress on this conjecture and also its version in terms of ternary quadratic forms. This is based on our joint works with Yuan-Zhang, Burungale, and He-Xiong.

BSD 猜想和 Iwasawa 理论

万昕 (中国科学院数学与系统科学研究院)

摘要

在这个报告中, 我们首先介绍 BSD 猜想以及 Iwasawa 理论研究的发展和重要结果. 之后我们讨论一些最新的进展和证明思想.

An algebraic construction of K-moduli space

许晨阳 (普林斯顿大学)

摘要

K-stability of Fano varieties has become a fast developed topic in algebraic geometry. One major output is the construction of moduli spaces of K-(semi,poly)-stable Fano varieties, which resolves a number of pathological issues for families of general Fano varieties. The purely algebraic construction is built on a systematical study of K-stability using higher dimensional geometry, including a more comprehensive understanding of the notion of K-stability (for Fano varieties). We will survey recent results, aiming at general audience.

实酉群的局部 Gan–Gross–Prasad 猜想

薛航 (亚利桑那大学)

摘要

Weyl 的一个经典结果描述了紧致酉群 $U(n+1)$ 的不可约表示在 $U(n)$ 上限制的直和分解. 局部 Gan–Gross–Prasad 猜想将其推广到非紧酉群的情况. 利用 theta 对应和 Schwartz 同调, 我们证明这个猜想.

Arithmetic Hodge index theorem over finitely generated fields

袁新意 (北京大学)

摘要

The Hodge index theorem of Faltings and Hriljac is an identity between Arakelov intersection numbers over an arithmetic surface and Neron-Tate heights of the Jacobian variety of the generic fiber. The goal of this talk is to introduce a generalization of the theorem to finitely generated fields, based on a theory of adelic line bundles over finitely generated fields. This is joint work with Shou-Wu Zhang.

The Weyl group and the nilpotent orbits

恽之玮 (麻省理工学院)

摘要

The Weyl group and the nilpotent orbits are two basic objects attached to a semisimple Lie group. The interplay between the two is a key ingredient in the classification of irreducible representations in various contexts. In this talk, I will describe two very different geometric constructions to relate these two objects, due to Kazhdan-Lusztig, Lusztig, and myself. The main result is that these two constructions give the same maps between conjugacy classes in the Weyl group and the set of nilpotent orbits. This settles several conjectures in the literature.

特殊除子的生成函数及其应用

张伟 (麻省理工学院)

摘要

整数上的正定二次型定义的经典 theta 函数可以被看成是球面上整点数的生成函数; 这些生成函数是模形式这一性质提供了研究正定二次型的有力工具.

在不定二次型的情形下, 我们考虑一类定义在全实数域上的典型群的志村簇上的特殊除子, 以及它们的整模型. 我们证明这些除子的生成函数同样是模形式, 并简介这一性质在联系 L-函数和代数链这一领域的一些应用. Joint works with Chao Li and with Andreas Mihatsch.

朗兰兹参数的模空间

朱歆文 (加州理工学院)

摘要

我们最近提出了一些关于朗兰兹纲领的新的猜想. 为了陈述这些猜想, 我们构造了朗兰兹参数的模空间. 在这个报告里我们主要讨论这些模空间的构造. 如果时间允许, 我们讨论这些新的猜想.