



中国科学技术大学
University of Science and Technology of China

2025年合肥数论 及其应用研讨会

红专并进
理实交融

会议手册

安徽合肥·2025年6月7日-6月8日

主办单位：数学科学学院





»» 会议须知

主办单位

中国科学技术大学

报到地点

合肥市包河区金寨路64号（金寨路与太湖路交口）江南春酒店（南七店）。

会议地点

江南春酒店7楼会议厅



会议日程

6月7日（周六）		
时 间	报告人	报告题目
08:30-09:10	王天泽	An attempt to Goldbach conjecture and the geometric basis of some Siegel upper half space
09:10-09:50	陈永高	A generalization of the Erdos-Birch theorem
09:50-10:30	休息	
10:30-11:10	李红泽	The bound for cap set
11:10-11:50	洪绍方	On the sums of polynomial units modulo \$n\$
中午 自助中餐（江南春酒店）		
15:00-15:40	张文鹏	On the \$2k\$-th power mean of one kind character sums modulo an odd prime
15:40-16:20	姚家燕	\$W\$-coprimality, and upper bounds for \$L\$-functions in positive characteristic
16:20-16:40	休息	
16:40-17:20	易 媛	On the Dedekind sums and related problem
晚餐（江南春酒店）		
6月8日（周日）		
08:30-09:10	岳 勤	Decoding algorithm of twisted GRS codes and twisted Goppa codes
09:10-09:50	袁平之	Permutation polynomials of some special forms
09:50-10:10	休息	
10:10-10:50	吴 强	一种搜寻全实正代数整数的无遗算法
10:50-11:30	徐哲峰	Representations of element in residue class ring \$\mathbb{Z}_q\$ as sum of primitive or Lehmer elements
中午 自助中餐（江南春酒店）		
14:00-16:30	分组自由讨论	

报告题目及摘要

陈永高（南京师范大学）

题目：A generalization of the Erdős-Birch theorem

摘要：Let $\mathbb{N}_0$ denote the set of all nonnegative integers. A set T of positive integers is called complete if every sufficiently large integer is the sum of distinct integers taken from T . In 1959, Birch confirmed a conjecture of Erdős by proving that the set $\{s_1^{x_1}s_2^{x_2} : x_1, x_2 \in \mathbb{N}_0\}$ is complete if $s_1, s_2 > 1$ are integers with $\gcd(s_1, s_2) = 1$. In this talk, the following result is proved: if $s_1, \dots, s_k > 1$ are integers, then the set

$$\{s_1^{x_1} \cdots s_k^{x_k} : x_1, \dots, x_k \in \mathbb{N}_0\}$$

is complete if and only if $\gcd(s_1, \dots, s_k) \leq 2$. This is a joint work with Wang-Xing Yu and Shi-Qiang Chen.

洪绍方（四川大学）

题目：On the sums of polynomial units modulo n

摘要：Let $f(x) \in \mathbb{Z}[x]$ be a non-constant polynomial. Let n, k and c be integers such that $n \geq 1$ and $k \geq 2$. An integer a is called an f -unit in the ring $\mathbb{Z}_n$ of residue classes modulo n if $\gcd(f(a), n) = 1$. In this paper, we use the principle of cross-classification to derive an explicit formula for the number $\mathcal{N}_{k,f,c}(n)$ of solutions $(x_1, \dots, x_k)$ of the congruence $x_1 + \dots + x_k \equiv c \pmod{n}$ with all x_i being f -units in the ring $\mathbb{Z}_n$. It extends a result of Anand, Chattopadhyay and Roy. Furthermore, we arrive at more explicit formula for $\mathcal{N}_{k,f,c}(n)$ when $f(x)$ is linear or quadratic. This generalizes the formula of Brauer obtained in 1926 and that of Yang and Zhao gotten in 2017.



报告题目及摘要

李红泽（上海交通大学）

题目：The bound for cap set

摘要：Cap 集合是数论中的一个很有趣的研究对象，它是不包含三项等差数列的某种集合，关于它的大小是一个比较重要的组合数论问题，本报告简要介绍关于 Cap 集合的上下界估计的研究方法和主要进展。

王天泽（河南省科学院/华北水利水电大学）

题目：An attempt to Goldbach conjecture and the geometric basis of some Siegel upper half space

摘要：In this talk, we make a novel attempt to explore potential connections between the Goldbach conjecture and the geometric structure of Siegel upper half spaces. By reformulating the Goldbach conjecture through the lens of automorphic forms and modular varieties, we establish a geometric framework that relates prime distribution to special cycles in Siegel modular varieties. This is a joint work with Tianqin Wang and Hongwen Lu.

吴强（西南大学）

题目：一种搜寻全实正代数整数的无遗算法

摘要：在这个报告中，我们将介绍一种无遗漏的搜寻具有某种特性的全实正代数整数的算法，并举例说明这种算法在诸如关于全实正代数整数绝对迹下界的 Schur-Siegel-Smyth 迹问题和关于代数整数绝对 Mahler 测度下界的 Lehmer 问题等问题的研究中的应用。

姚家燕（清华大学）

题目：W-coprimality, and upper bounds for L -functions in positive characteristic

摘要：In this talk we shall discuss two problems in analytic number theory over function fields with positive characteristic, and present our solutions. More precisely, we shall count w -coprime S -integers and S -integral ideals, and estimate the upper bounds for L -functions in positive characteristic.

报告题目及摘要

易媛（西安交通大学）

题目：On the Dedekind sums and related problem

摘要：In this talk, we focus on the properties of Dedekind sums. First we review the classical results on the discrete mean value, the relation about Dedekind sums and Dirichlet L -function, and the generalized of reciprocity formulas in the values distribution of Dedekind sums. Furthermore, we show different methods to study the values distribution properties of Dedekind sums, and the sign changes problems.

徐哲峰（西北大学）

题目：Representations of element in residue class ring $\mathbb{Z}_q$ as sum of primitive or Lehmer elements

摘要：For positive integer q , additive representation of an element in residue class ring $\mathbb{Z}_q$ is an interesting problem. In this talk, we will consider the representations of an element in $\mathbb{Z}_q$ as sum of a Lehmer element and a k -th residue element, sum of a primitive element and a Lehmer element, or sum of two Lehmer elements or generalized Lehmer elements. Some sharp inequalities for the number of the representations will be given.

袁平之（华南师范大学）

题目：Permutation polynomials of some special forms

摘要：In this talk, we consider the problem of the number of γ for the polynomial $x + \gamma \text{Tr}(H(x))$ permute $F(q^n)$. In the last forty years or so this problem has received a lot of attention mainly due to its connections with a variety of fields, for example, blocking sets in $PG(2, q)$, the size of a set U over a finite field and the factorisation of abelian groups. We present some new and old results on these topic.

报告题目及摘要

岳勤 (南京航空航天大学)

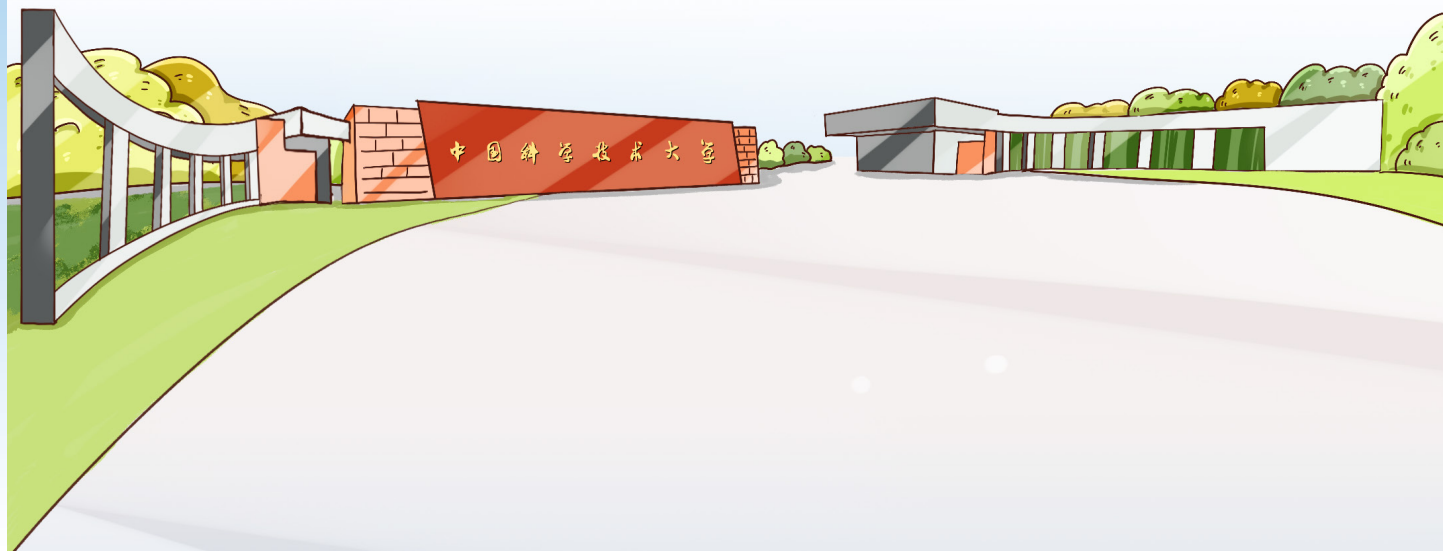
题目: Decoding algorithm of twisted GRS codes and twisted Goppa codes

摘要: In this talk, we use extended Euclid’s algorithm to support new decoding algorithms for two classes of maximum distance separable (MDS) twisted generalized Reed-Solomon (TGRS) codes of parameters $[n, n - t, t + 1]$ over $\mathbb{F}_q$. For t even, they can correct $\frac{t}{2}$ errors with time complexity $O(qn)$. Moreover, we also give a new decoding algorithm for a class of twisted Goppa codes. For even degree t of a Goppa polynomial, it can also correct $\frac{t}{2}$ errors, which generalized a $\lfloor \frac{t-1}{2} \rfloor$ -error-correcting decoding algorithm in [SY].

张文鹏（西北大学）

题目: On the $2k$ -th power mean of one kind character sums modulo an odd prime

摘要: The main purpose of this article is using the elementary method and the properties of the classical Gauss sums to study the calculating problem of one kind $2k$ -th power mean of the character sums modulo an odd prime, and give an exact calculating formula for it.



会议记录

