CACML 2022

2022 年全国数理逻辑年会

Chinese Annual Conference on Mathematical Logic 2022

2022 年 11 月 25 日 – 27 日，安徽 芜湖 安徽工程大学

November 25-27, Anhui Polytechnic University,Wuhu, Anhui

会议程序手册

会议模式(**Mode**)： 线上会议(**Online**)

会议网址(**Website**)：**https://logic2022.scievent.com/**

会 议 介 绍

2022年全国数理逻年会将于2022年11月25-27日在安徽芜湖举办(其中，11月25日为会议报到日)。本次会议由中国数学会数理逻辑专业委员会主办，安徽工程大学承办。会议旨在为数理逻辑及其应用的学者提供交流最新成果的平台，以开展广泛深入的学术交流与合作，进而更好地促进我国数理逻辑学科的发展。

本次会议设立下列主题：(1)集合论、(2)递归论、(3)模型论、(4)数学哲学，会议邀请国内外数理逻辑领域的专家就上述专题作主题报告。会议不收注册费，所有报名参加会议的与会者皆可免费听取会议期间所有学术报告。

受疫情影响，本次年会首次采取线上方式举行。线上会议将通过Zoom会议和腾讯会议工具进行。

Chinese Annual Conference on Mathematical Logic 2022 (CACML 2022) will be held in Wuhu, Anhui Province from November 25 to 27, 2022. This conference is hosted by the Professional Committee on Mathematical Logic of the Chinese Mathematical Society and organized by the Anhui Polytechnic University. The purpose of the conference is to provide a platform for scholars of Mathematical Logic and its applications to report the latest achievements, and carry out extensive academic exchanges and cooperation, so as to promote the development of Mathematical Logic in China.

This conference sets up the following topics: (1) Set Theory, (2) Recursion Theory, (3) Model Theory, (4) Philosophy of Mathematics. The conference will invite domestic and foreign experts in the field of mathematical logic to make thematic lectures on the above topics. The CACML 2022 will not charge any conference registration fee.

Due to the increasingly severe Covid-19 situation, this annual conference will be held online. The online meeting will be conducted through Zoom meeting and Tencent meeting tools.

会 议 组 织(Committee)

科学委员会(Scientific Committee)（按拼音首字母为序）

丁龙云(Longyun Ding)　　　南开大学(Nankai　University)

高　速(Su Gao)　　　　　南开大学(Nankai　University)

郝兆宽(Zhaokuang Hao)　　复旦大学(Fudan University)

施翔晖(Xianghui Shi)　　　北京师范大学(Beijing Normal University)

宋诗畅(Shichang Song)　　北京交通大学(Beijing Jiaotong University)

吴刘臻(Liuzhen Wu)　　　中国科学院数学与系统科学研究院(AMSS)

喻　良(Liang Yu)　　　　南京大学(Nanjing University)

张树果(Shuguo Zhang)　　四川大学(Sichuan University)

赵希顺(Xishun Zhao)　　　中山大学(Sun Yat-sen University)

组织委员会(Organizing Committee)

吴小太(Xiaotai Wu)　　　安徽工程大学(Anhui Polytechnic University)

张培雨(Peiyu Zhang)　　安徽工程大学(Anhui Polytechnic University)

王　伟(Wei Wang)　　　安徽工程大学(Anhui Polytechnic University)

尹　志(Zhi Yin)　　　　安徽工程大学(Anhui Polytechnic University)

主办单位　　　中国数学会数理逻辑专业委员会

承办单位　　　安徽工程大学

会 议 日 程(Schedule)

北京时间 Beijing Time (GMT +8)

2022 年 11 月 26 日 上午 Nov. 26th Morning	
8:20-8:40	开幕式、云合影 Opening and Cloud Photos 腾讯会议(Tencent Meeting)
8:40-9:40	**大会报告 Plenary Lecture**
	Zoom 会议(Zoom Meeting)
	主持人 Host：张树果 Shuguo Zhang
	报告人 Speaker：金人麟 Renling Jin
	题目 Title：Many Levels of Infinities and Multidimension van der Waerden's Theorem
9:40-10:00	茶歇 Break
10:00-11:00	**大会报告 Plenary Lecture**
	Zoom 会议(Zoom Meeting)
	主持人 Host：喻良 Liang Yu
	报告人 Speaker：Antonio Montalban
	题目 Title：A Robuster Scott Rank

11:00-11:40	分组报告 Section Lecture	
	Zoom 会议(Zoom Meeting)	腾讯会议(Tencent Meeting)
	主持人：王玮 Host：Wei Wang	主持人：琚凤魁 Host：Fengkui Ju
	报告人：何孟哲 Speaker：Meng-Che "Turbo" Ho	报告人：李大柱 Speaker：Dazhu Li
	题目 Title：Free structures and limiting density	题目 Title：Logical approaches to the Cops and Robber game

线上会议使用 Zoom 会议(Zoom Meeting)和腾讯会议(Tencent Meeting)
Zoom 会议(Zoom Meeting)：会议号 ID: 833 0653 1233　密码 Passcode: 202211
腾讯会议(Tencent Meeting)：会议号 ID: 735 8316 5465　密码 Passcode: 202211

	2022 年 11 月 26 日 下午 Nov. 26th Afternoon		
14:30-15:30	大会报告　Plenary Lecture		
	Zoom 会议(Zoom Meeting)		
	主持人 Host：丁龙云　Longyun Ding		
	报告人 Speaker：张树果 Shuguo Zhang		
	题目 Title：Ideals, Ultrafilters and Cardinal Invariants of the Continuum		
15:30-16:30	大会报告　Plenary Lecture		
	Zoom 会议(Zoom Meeting)		
	主持人 Host：高速　Su Gao		
	报告人 Speaker：Stevo Todorcevic		
	题目 Title：A Dual Ramsey Theorem for Finite Trees		
16:30-16:50	茶歇 Break		
16:50-17:30	分组报告 Section Lecture		
	Zoom 会议(Zoom Meeting)		腾讯会议(Tencent Meeting)
	主持人：吴刘臻 Host：Liuzhen Wu		主持人：姚宁远 Host： Ningyuan Yao
	报告人：袁嘉辰 Speaker：Jiachen Yuan		Speaker：Rizos Sklinos
	题目 Title：How far is strong compactness from almost strong compactness		题目 Title：Fields interpretable in nonabelian free groups
17:30-18:30	大会报告　Plenary Lecture		
	Zoom 会议(Zoom Meeting)		
	主持人 Host：William Johnson		
	报告人 Speaker：Boris Zilber		
	题目 Title：Applied Model Theory beyond first order		

	2022 年 11 月 27 日 上午 Nov. 27th Morning	
	分组报告 Section Lecture	
8:20-9:00	Zoom 会议(Zoom Meeting)	腾讯会议(Tencent Meeting)
	主持人：施翔晖 Host：Xianghui Shi	主持人：郝兆宽 Host：Zhaokuang Hao
	报告人：彭银河 Speaker：Yinhe Peng	报告人：丁一峰 Speaker：Yifeng Ding
	题目 Title：$MA_{\omega_1}(S)[S]$ does not imply K_2	题目 Title：Examining the Fundamental Theorem of World Theory in Modal Logics with Propositional Quantifiers
	分组报告 Section Lecture	
9:00-9:40	Zoom 会议(Zoom Meeting)	腾讯会议(Tencent Meeting)
	主持人：施翔晖 Host：Xianghui Shi	主持人：郝兆宽 Host：Zhaokuang Hao
	Speaker：David Schrittesser	报告人：杨睿之 Speaker：Ruizhi Yang
	题目 Title：Nonstandard Methods for Statistics	题目 Title： 数学多元论与万象有穷集
9:40-10:00	茶歇 Break	
	分组报告 Section Lecture	
10:00-10:40	Zoom 会议(Zoom Meeting)	腾讯会议(Tencent Meeting)
	主持人：宋诗畅 Host：Shichang Song	主持人：赵希顺 Host：Xishun Zhao
	Speaker：William Johnson	报告人：方楠 Speaker：Nan Fang
	题目 Title： Around definable types in p-adically closed fields	题目 Title：Integer-valued martingales and cl-reductions
	分组报告 Section Lecture	
10:40-11:20	Zoom 会议(Zoom Meeting)	腾讯会议(Tencent Meeting)
	主持人：宋诗畅 Host：Shichang Song	主持人：赵希顺 Host：Xishun Zhao
	报告人：姚宁远 Speaker：Ningyuan Yao	报告人：谢若非 Speaker：Ruofei Xie
	题目 Title： On Algebraicity of definable groups over the field of p-adic numbers	题目 Title：An Investigation of the Rademacher series with Algorithmic Randomness
11:20-12:00	数理逻辑发展讨论 Discussion 腾讯会议(Tencent Meeting)	

会议报告

大会报告 (一)

题　目： A Robuster Scott Rank

报告人： Antonio Montalban (加州大学伯克利分校 University of California, Berkeley)

Antonio Montalban is a professor at University of California, Berkeley. His major research interesting is Computability Theory. He has published more than 70 papers. He also has monograph "Computable Structure Theory: Within the arithmetic" published in Cambridge University Press. He was once an editor of Transactions and Memoirs of AMS from 2012-2016, and now he is an editor of Notices of AMS and Perspectives in Mathematical Logic Series. He was awarded the Sacks Prize in 2005, AMS Centennial Fellowship in 2009 and Packard Fellowship in 2010. He was also an invited session speaker at the ICM 2014.

摘　要： The Scott rank was introduced in the 60's as a measure of complexity for algebraic structures. There are various other ways to measure the complexity of structures that give ordinals that are close to each other, but are not necessarily equal. We will introduce a new definition of Scott rank where all these different ways of measuring complexity always match, obtaining what the author believes is the correct definition of Scott Rank. We won't assume any background in logic, and the talk will consist mostly of an introduction to these topics.

大会报告 (二)

题　目： Applied Model Theory beyond first order

报告人： Boris Zilber (牛津大学 University of Oxford)

Boris Zilber is a professor of Mathematical Logic at the University of Oxford. His research interests are Model Theory and its applications to Geometry and Number Theory. He has published more than 50 papers and several books in these areas. He received the Senior Berwick Prize in 2004 and the Pólya Prize in 2015 from the London Mathematical Society.

摘　要： In the last several decades there has been a gradual shift from first order model theory to its non-elementary versions. This is driven by discoveries both of new model-theoretic notions and constructions and of new applications in number theory and algebraic geometry.

I will discuss one such development: categoricity and stability of abstract elementary classes and their connection to analytic aspects of algebraic/arithmetic geometry.

大会报告 (三)

题　目： Many Levels of Infinities and Multidimension van der Waerden's Theorem

报告人： 金人麟 Renling Jin (查尔斯顿学院 College of Charleston)

Renling Jin is a professor at College of Charleston. He works at the interface of Mathematical Logic(including Nonstandard Analysis, Set Theory, and Model Theory) and other Mathematical fields(including Additive-Combinatorial Number Theory, Measure Theory, and General Topology).He has published many papers in Advances in Mathematics, Transactions of American Mathematical Society, Journal of Symbolic Logic, and many others.

摘　要： There could be more than one elementary embedding between a model and its elementary extension. We develop a nonstandard analysis framework by iterating ultrapower constructions and present two different elementary embeddings at each stage. We hope that this framework gives powerful tools in applications. As a testing case we give a simple nonstandard proof of multidimensional van der Waerden's theorem in this framework.

大会报告 (四)

题　目： A Dual Ramsey Theorem for Finite Trees

报告人： Stevo Todorcevic (多伦多大学 University of Toronto)

Stevo Todorcevic is a mathematician at the University of Toronto. His research area involves Mathematical Logic, Set Theory, and their applications to Pure Mathematics. He holds the Canada Research Chair in mathematics at the University of Toronto, and a director of research position at the Centre national de la recherche scientifique in Paris.

Stevo Todorcevic is the winner of the first prize of the Balkan Mathematical Society for 1980 and 1982, the 2012 CRM-Fields-PIMS prize in mathematical sciences, and the Shoenfield prize of the Association for Symbolic Logic for "outstanding expository writing in the field of logic" in 2013, for his book "Introduction to Ramsey Spaces". He was selected by the Association for Symbolic Logic as their 2016 Gödel Lecturer. He became a corresponding member of the Serbian Academy of Sciences and Arts as of 1991 and a full member of the Academy in 2009. In 2016 he became a fellow of the Royal Society of Canada.

摘　要： We prove a dual Ramsey theorem for finite trees which in the case when the trees are simply finite linear orderings reduces to the famous Graham-Rothschild's theorem. This is joint work with Konstantinos Tyros.

大会报告 (五)

题　目： Ideals, Ultrafilters and Cardinal Invariants of the Continuum

报告人： 张树果 Shuguo Zhang (四川大学 Sichuan University)

Shuguo Zhang is a full professor at Sichuan University. His research fields are Set Theory and Set-Theoretic Topology. He has published many papers in Fundamenta Mathematicae, Topology and Its Applications, Journal of Symbolic Logic, and many others. He used to be the deputy dean of the school of Mathematics at Sichuan University. He has made a lot of efforts and great contributions to the Mathematical Logic Professional Committee re-becoming a branch of the Chinese Mathematical Society. He is the first chairman of the Mathematical Logic Professional Committee of the Chinese Mathematical Society.

摘　要： Ideals and ultrafilters play a very important role in mathematics. The theory of cardinal invariants of the continuum is an active research line of set theory. In the talk, I will survey our research progress obtained in last few years among ideals, ultrafilters and cardinal invariants of the continuum.

分组报告 (一)

题　目： Nonstandard methods for statistics

报告人： David Schrittesser (多伦多大学 University of Toronto)

摘　要： In recent years, there have been several exciting applications of methods from nonstandard analysis in the field of statistics. In this talk I will discuss recent joint work with Haosui Duanmu and Daniel M. Roy, in which we give a precise characterization of admissibility in Bayesian terms, solving a long-standing problem in the field of statistical decision theory. This result uses so-called hyperpriors, which can give infinitesimal weight to events, to achieve this characterization, and also has interesting classical consequences (that is, not mentioning hyperpriors or infinitesimals).

分组报告 (二)

题　目： $\mathrm{MA}_{\omega_1}(S)[S]$ does not imply $\mathcal{K}_2$

报告人： 彭银河 Yinhe Peng (中国科学院数学与系统科学研究院 Academy of Mathematics and System Science, Chinese Academy of Sciences)

摘　要： $\mathrm{MA}_{\omega_1}(S)$ is the statement that S is a Suslin tree and for any c.c.c. poset that preserves S to be Suslin, for any collection of ω_1 many dense subsets, there is a filter meeting them all. $\mathrm{MA}_{\omega_1}(S)[S]$ holds if the universe is a forcing extension by S over a model of $\mathrm{MA}_{\omega_1}(S)$. $\mathcal{K}_2$ is the assertion that every c.c.c. partition of $[\omega_1]^2$ has an uncountable 0-homogeneous subset. And a partition $[\omega_1]^2 = K_0 \cup K_1$ is a *c.c.c. partition* if every uncountable family of finite 0-homogeneous sets contains two members whose union is also 0-homogeneous.

Larson and Todorcevic asked if $\mathrm{MA}_{\omega_1}(S)[S]$ implies $\mathcal{K}_2$. A positive answer will distinguish two closely related properties – $\mathcal{K}_2$ and MA_{ω_1} – since MA_{ω_1} fails in models of $\mathrm{MA}_{\omega_1}(S)[S]$. However, we answer this question negatively. This is a joint work with Liuzhen Wu.

分组报告 (三)

题 目: How far is strong compactness from almost strong compactness

报告人: 袁嘉辰 Jiachen Yuan (利兹大学 University of Leeds)

摘 要: Almost strong compactness of κ can be characterized as follows: for every $\delta < \kappa < \lambda$, there is an elementary embedding $j_{\delta,\lambda} : V \to M$ with critical point $\geq \delta$, so that $j_{\delta,\lambda}``\lambda \subseteq D \in M$ and $M \vDash |D| < j_{\delta,\lambda}(\kappa)$. Boney and Brook-Taylor were then wondering whether almost strong compactness is essentially the same as strong compactness. Recently, Goldberg has proved that if κ is of uncountable cofinality then SCH from below implies these two closely related concepts are the same. In this joint work with Zhixing You, we show that these two can be different in general cases.

分组报告 (四)

题 目: Integer-valued martingales and cl-reductions

报告人: 方楠 Nan Fang (中国科学院软件研究所 Institute of Software, Chinese Academy of Sciences)

摘 要: Integer-valued martingales are martingales which take values from integers. A real is called IVR if there is no integer-valued computable martingale succeeds on it. A cl-reduction is a Turing reduction whose use function is bounded by a function $n + c$, where c is a constant. In this talk, we will show some correspondence between them and prove some related facts.

分组报告 (五)

题 目: Free structures and limiting density

报告人: 何孟哲 Meng-Che "Turbo" Ho (加州州立大学北岭分校 California State University，Northridge)

摘 要: Gromov asked what a typical group looks like, and he suggested a way to make the question precise in terms of limiting density. The typical finitely presented group is known to share some important properties with the non-abelian free groups. Knight conjectured that the typical group satisfies a zero-one law and has the same first-order theory as the free group. Kharlampovich and Sklinos verified this conjecture for one-quantifier sentences.

We generalize Gromov's notion and Knight's question to structures in an arbitrary algebraic variety (in the sense of universal algebra). We give examples illustrating

different behaviors of the limiting density. Based on the examples, we identify sufficient conditions for the elementary first-order theory of the free structure to match that of the typical structure; i.e., a sentence is true in the free structure if and only if it has limiting density 1.

This is joint work with Johanna Franklin and Julia Knight.

分组报告 (六)

题　目: An Investigation of the Rademacher series with Algorithmic Randomness

报告人: 谢若非 Ruofei Xie (惠灵顿维多利亚大学 Victoria University of Wellington)

摘　要: Consider $\sum_n x_n a_n$, the summation of the weighted Rademacher series, where the Rademacher series (x_n) is a binary sequence of -1 and 1, and the weight (a_n) is a sequence of real numbers. The Rademacher theorem states that the summation diverges for almost every sequence (x_n) when $\sum_n a_n^2$ is infinite and converges for almost every (x_n) when $\sum_n a_n^2$ is finite. The theorem gives a nice result about the amount of (x_n) that makes the summation diverge/converge and how this depends on the weight (a_n). However, it says nothing about the structure of the desired (x_n).

In this talk, we will use the language of algorithmic randomness to give a more precise description of the theorem. We will study the class of desired (x_n) and compare it with some common concepts in computability theory.

分组报告 (七)

题　目: Fields interpretable in nonabelian free groups

报告人: Rizos Sklinos (中国科学院数学与系统科学研究院 Academy of Mathematics and System Science, Chinese Academy of Sciences)

摘　要: After Kharlampovich-Myasnikov and Sela proved that nonabelian free groups share the same first-order theory, the model theoretic interest for the subject arose. A historically important question for any natural first-order theory is whether it interprets an infinite field or not. In this talk I will explain some of the principal ideas in proving that no infinite field is interpretable in the first-order theory of nonabelian free groups.

分组报告 (八)

题　目: Around definable types in p-adically closed fields

报告人: William Johnson (复旦大学 Fudan University)

摘　要: Any definable type over a model has a minimal set of parameters over which the type is definable. For technical reasons, this minimal set of parameters is called the "code" of the definable type. In general, the code of a definable type will be a tuple of "imaginary" elements, that is, elements of Shelah's M^{eq}, rather than "real" elements from

the original model M. In p-adically closed fields (pCF) like the field of p-adic numbers, we show that the codes of definable types are always tuples of "real" elements. This can be used to show that the quotient of a definable set by a definable group G is definable (rather than interpretable) when G satisfies the technical condition "definable f-generics" (dfg). This explains previous phenomena around dfg groups observed by Pillay and Yao. In the process of analyzing definable types in pCF, we learn some other technical facts about definable types. These technical facts have applications to the study of definable and interpretable topological spaces in pCF. For example, we show that most notions of "definable compactness" are equivalent to each other, in this setting. This is joint work with Pablo Andújar Guerrero.

分组报告 (九)

题 目: On Algebraicity of definable groups over the field of p-adic numbers

报告人: 姚宁远 Ningyuan Yao (复旦大学 Fudan University)

摘 要: Zilber conjectured that any simple group of finite Morley rank is isomorphic to an algebraic group over an algebraically closed field, which was formulated in Cherlin's paper, without the finiteness of rank assumption. The conjecture now was known as the Cherlin-Zilber Conjecture or Algebraicity Conjecture. In this talk we will present several results regarding algebraicity of groups definable over the field of p-adic numbers. In the first part I will give a brief overview of the subject, and present joint work with Pillay and Jonhson on which we showed that definable f-generic groups and abelian groups are eventually algebraic. In the second part of the talk I will present a recent result which indicates that every open subgroup of an abelian algebraic group over the field of p-adic numbers is definable.

分组报告 (十)

题 目: Examining the Fundamental Theorem of World Theory in Modal Logics with Propositional Quantifiers

报告人: 丁一峰 Yifeng Ding (北京大学 Peking University)

摘 要: A core commitment of the popular possible world semantics for modal logics is that a proposition is possible just in case this proposition is true at a possible world. Call this commitment the Fundamental Theorem of World Theory (FTWT). While FTWT can be assumed without loss of generality, at least mathematically, when studying most of the propositional modal logics we are interested in, FTWT reveals itself in full strength inside modal logic with propositional quantifiers. In this talk, we discuss how FTWT is formalized in modal logics with propositional quantifiers and examine some purported ways to show FTWT "logically". Eventually, we argue that they are not successful, and along the way, we mention some completeness results for modal logic with propositional quantifiers in which we have modalities of possibility and actuality.

分组报告 (十一)

题　目: Logical approaches to the Cops and Robber game

报告人: 李大柱 Dazhu Li (中国科学院大学，中国科学院哲学研究所 University of Chinese Academy of Sciences; Institute of Philosophy, Chinese Academy of Sciences)

摘　要: Interactions between logic and games are various, and both of them can be used for analyzing each other. Games on graphs can be considered for modeling reachability problems, search problems, dynamic networks and social networks among others, providing a testbed for various computational problems. The popular Cops and Robber game is a case in point in this area which has been studied extensively from the algorithmic perspective along with its many variants. In this talk, I will introduce some logical proposals matching the game from different levels: modeler's perspective and players' perspective. In particular, I will show how adding a constant for equality may lead a logic undecidable, and provide formal tools to capture how players can reason in the process of a game. Many of their logical properties will be discussed, including their axiomatization, expressiveness and computational complexity, which would also shed light on the study of existing problems in product logic.

The talk is based on my recent works with Qian Chen (Tsinghua University), Sujata Ghosh (Indian Statistical Institute), Fenrong Liu (Tsinghua University), Katsuhiko Sano (Hokkaido University) and Yaxin Tu (Tsinghua University).

分组报告 (十二)

题　目: 数学多元论与万象有穷集

报告人: 杨睿之 Ruizhi Yang (复旦大学 Fudan University)

摘　要: 随着非标准模型和独立性结果的大量出现，数学哲学中的多元论立场开始得到更多的关注。我们将介绍和分析数学哲学中多元论与单一论立场。W. H. Woodin 在 2011 年给出了一个算术理论中万象有穷集的构造，J. D. Hamkins 和 Woodin 在 2017 年将其推广到集合论中。万象有穷集现象一般被认为是多元论立场的又一佐证。我们将分析一些不同的万象有穷集的构造，并尝试利用万象有穷集现象反过来为数学一元论立场提供帮助。