2016 年全国数理逻辑学术研讨会

2016 Chinese Mathematical Logic Conference

会 议 手 册

复旦大学哲学学院

中国数学学会数理逻辑专业委员会

会议日程

15:00 - 15:15	茶歇

主持：别荣芳 (北京师范大学信息科学与技术学院)

15:15 - 15:45	*To do something else*

琚凤魁
(北京师范大学哲学与社会学学院)

15:45 - 16:15	*Very Large Cardinals and Combinatorics*

Vincenzo Dimonte
(Gödel Research Center, Vienna, Austria)

16:15 - 16:45	胡塞尔对弗雷格外延主义数论的批判

李义民
(九江学院马克思主义学院)

17:15	晚餐

	5 月 20 日

主持：冯琦 (中科院数学与系统科学研究院)

9:00 - 9:45   *Equivalence Relations and Borel Reduction*

丁龙云

(南开大学数学科学学院)

9:45 - 10:30   *On higher Friedman's conjecture and degree determinacy on Π-definable sets*

喻良

(南京大学数学系)

10:30 - 10:45	茶歇

主持：冯琦

10:45 - 11:45   数理逻辑专业委员会扩大会议

11:45-14:00	午休

14:00 - 16:00   中国数理逻辑发展专题讨论

基数不变量与 Tukey 归约

张树果
Shuguo Zhang

连续统的基数不变量理论是近 40 年来发展起来的用于研究实直线（连续统）组合结构的公理集合论分支，它在相关的拓扑、分析、代数等数学领域有重要应用。虽然力迫方法及理论在基数不变量的研究中起着不可或缺的作用，但另一个结构性方法——Tukey 归约在基数不变量理论的研究中同样作用非凡。

Tukey 最初引入现称为"Tukey 归约"的概念，揭示出收敛理论的重要内在联系。Fremlin 把 Tukey 归约成功地用来研究在测度论及泛函中出现的有向偏序集结构，后来经 Shelah, Judah,Bartoszynski，Raisonnier 及 Stern 等人的工作，最终完整得到了揭示测度与拓扑间重要基数特性联系的著名的 Cichon 图。

我们将汇报近几年我们在基数不变量、Tukey 归约及相关问题的研究方面的进展。

Unprovability and Beyond

蔡铭中
Mingzhong Cai

There are a large number of open conjectures that resist repeated attempts from the most brilliant human brains, and one nature worry is that, could any of these conjectures be actually unprovable from the current axiom system, for example ZFC? If so, then the next natural question would be, how can we prove that a statement is unprovable? In this talk we investigate and try to understand a deeper incompleteness phenomenon that "being unprovable" could be arbitrarily hard to prove, and we bring such phenomenon into higher levels that an analogous result holds after adding all truths of bounded quantifier complexity into the base theory.

Equivalence Relations and Borel Reduction

丁龙云
Longyun Ding

In Descriptive Set Theory, Borel reduction is an useful tool to characterize the relative complexity of equivalence relations from vary branches in mathematics. In resent years, many logicians worked on this topic and many interesting results were founded. In this talk, we will give a survey on this topic, from the beginning to some brand new results.

On higher Friedman's conjecture
and degree determinacy on Π-definable sets

喻 良
Liang Yu

Friedman conjectured that every uncountable Δ^1_1-set conjecture contains an upper cone of Δ^1_1-degrees and degree determinacy on Π^1_{2n+1}-sets says every non-thin Π^1_{2n+1}-definable set has an upper cone of $\Q^1_{2n+1}$-degrees. Friedman's conjecture was confirmed by Martin and Q_1-determinacy for Π^1_1-sets was proved by Harrington. These questions for higher levels were raised by Kechris, Martin and Solovay in a Cabal seminar paper. We first answer the questions for level-3 by performing a recursion theoretical coding argument over Martin-Solovay tree. Then by a combination of a generalization the argument and the recent work of Zhu, we answer the question for all levels. This is joint work with Yizheng Zhu.

Random graphs, first-order logic, and AC^0 circuits

陈翌佳

Yijia Chen

First-order logic (FO) has very limited expressive power. One of the best-known examples is its 0-1 law on random graphs. Among others, it implies that FO cannot express PARITY. However, once the graphs are ordered, the 0-1 law completely breaks down. Thus, to prove FO cannot define PARITY on ordered graphs, one uses the remarkable machinery of Hastad's Switching Lemma on AC^0 circuits.

In 2008, Rossman proved that the k-clique problem cannot be defined by FO using only k/4 variables, resolving a long-standing open problem in finite model theory and complexity theory. His proof is built on a brilliant application of Hastad's Switching Lemma on ordered random graphs.

In the talk, I will explain our recent work extending Rossman's result to the so-called planted clique conjecture. Among others, it shows that any super-constant clique cannot be characterized by FO, even in case that the given ordered graphs have a huge planted clique.

Bounded Correctness Checking of Properties
of the Computation Tree Logic

时序逻辑 CTL 性质的限界正确性检查

张文辉

Wenhui Zhang

Bounded correctness checking is a kind of methods which extends bounded model checking in such a way that it tries to verify a property and to falsify the property on a given model at the same time until there is a conclusion by applying the bounded semantics instead of the standard semantics. We demonstrate that bounded correctness checking and the traditional symbolic model checking are complementary, and provide experimental data showing that this is also the case in various application examples.

Uniform Interpolation in Multi-Agent Modal Logics

方良达
Liangda Fang

In the past decades, uniform interpolation has been investigated for many logics and has found many applications in knowledge representation and reasoning. However, uniform interpolation in multi-agent modal logics has largely been unexplored. In this paper, we study uniform interpolation in multi-agent modal logics. Based on the canonical formulas of modal logics introduced by Moss, we propose a syntactical way of computing uniform interpolant. We show that the uniform interpolant from a satisfiable canonical formula can be computed by simply substituting the literals of the atom with true. Thus we show that Kn, Dn, Tn, K45n, KD45n and S5n have uniform interpolation.

To do something else

琚凤魁
Fengkui Ju

This paper presents two deontic logics following an old idea: normative notions can be defined in terms of the consequences of performing actions. The two deontic logics are based on two special propositional dynamic logics; they interpret actions as sets of state sequences and have a process modality. The difference between the two deontic logics is that they contain different formalizations of refraining to do an action. Both of the two deontic logics have a propositional constant saying that this is a bad state. The normative notions are expressed by use of the process modality and the propositional constant. This is a joint work with Jan van Eijck.

Very Large Cardinals and Combinatorics

Vincenzo Dimonte

Large cardinals are currently one of the main areas of investigation in Set Theory, and they have been proven essential in the analysis of the relative consistency of mathematical propositions. It is therefore natural to ask how flexible can be the set-theoretical universe under large cardinals assumptions. In other words, once a large cardinal hypotheses is assumed, which structural characteristics are admissible in the universe? Which combinatorial principles are consistent or inconsistent?

The talk will delineate the state-of-the-art of this research applied to the large cardinal hypotheses that are at the top of the large cardinal hierarchy: rankinto-rank embeddings like I3, I1 and I0. We will show that they are consistent with L-like properties like GCH, Diamond, V = HOD, while under I0 we have also the consistency of I1 and the opposite of those principles, like the negation of SCH and others.

Work in collaboration with Sy Friedman and Liuzhen Wu.

胡塞尔对弗雷格外延主义数论的批判

李义民

"数是什么"是哲学中数论的核心问题。从现有材料看，在研究数和算术的本质问题方面，弗雷格的《算术基础》（Die Grundlagen der Arithmetik，以下简称 GL）与胡塞尔的《算术哲学》（Philosophie der Arithmetik，以下简称 PA）无疑是成就最高的。二者分别取外延主义和内涵主义的不同立场，并因此都试图全面否定对方的数论。这里将专门探讨胡塞尔对 GL 的批判。

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其他事项

会议网站：

http://logic.fudan.edu.cn/2016CMLC

后续会在网站上更新会议论文、幻灯片以及照片。

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