

Abstrakty/Abstracts
Pražské setkání logiků/ Prague gathering of Logicians
7. - 8.2.2014

7.2. 10:15-11:15

Neil Thapen: *Parity Games and Propositional Proofs*

Parity games are a class of infinite games played on finite graphs, with many applications. I will describe a connection between the problem of deciding who wins a parity game and the problem of deciding whether a formula has a short refutation in the resolution proof system.

7.2. 14:30-15:30

Sean Walsh: *The Constructible Universe, the Naive Conception, and Intensional Logic*

This paper studies the relationship between three foundational systems: Gödel's Constructible Universe of Sets, the naive conception of set found in consistent fragments of Frege's Grundgesetze, and the intensional logic of Church's Logic of Sense and Denotation. One basic result shows how to use the constructible sets to build models of fragments of Frege's Grundgesetze from which one can recover these very constructible sets using Frege's definition of membership. This result also allows us to solve the related consistency problem and joint consistency problems for abstraction principles with limited amounts of comprehension. In addition, we are able to prove the theory consisting of all these abstraction principles with limited amounts of comprehension interprets a weak fragment of set theory when coupled with a form of global choice. Another basic aim of this paper is to show how to "factor" these results via a consistent fragment of Church's Logic of Sense and Denotation: so one may use the constructible sets to build models of Church's Logic of Sense and Denotation, from which one may then define models of the consistent fragments of Frege's Grundgesetze.

8.2. 11:00-12:00

Michal Koucký: *Catalytic Computation*

The known hierarchy theorems hold in a vacuum. However, our computation happens in a wider context. Although we may have only limited memory to carry out our computation we have access to almost unlimited amount of disk space provided at the end of the computation the disk contains exactly the same content as at the beginning. This naturally leads to a question: what can be computed in space s when we have access to read-write "catalytic" memory that we can use provided at the end of the computation the content of the catalytic memory is at its original, possibly incompressible, state. Is there any advantage in having this extra catalytic memory? We provide affirmative answer to this question (assuming NL differs from L). We show that in space s with catalytic memory we can compute deterministically functions computable in non-deterministic space s . We can extend the results even further. The main techniques come from a special form of reversible computation that we call transparent computation.

Joint work with: H. Buhrman, R. Cleve, B. Loff, F. Spielman.

8.2. 13:30-14:00

Vít Punčochář: *Assertibility as a Semantic Concept*

Entailment can be viewed as a relation which preserves some specific value. According to the standard picture the value in question is truth. This paper explores an alternative: The relation of entailment will be defined as assertibility preservation. It will be argued that this approach leads to some fruitful technical questions and helps us to model various phenomena of natural language in an adequate way.

8.2. 14:00-14:30

Ján Pich: *Circuit Lower Bounds in Bounded Arithmetics*

Is it possible that NP is hard for p-size circuits but there is no any efficient method how to witness errors of p-size circuits attempting to solve NP problems? Such a witnessing follows from certain cryptographic conjectures which are however not known to follow from the p-size circuit lower bound for SAT itself. The provability of p-size circuit lower bounds for SAT in sufficiently constructive theories gives us the same witnessing as well. Moreover, then all existential quantifiers in such a proof can be witnessed feasibly. If the existential quantifiers were witnessed more efficiently than in p-time, we could break certain hardness assumptions from complexity theory. This allows us to obtain a conditional unprovability of circuit lower bounds in some weak arithmetical theories.

8.2. 15:00-16:00

Stefan Ratschan: *First Order Theories of the Real Numbers: Beyond Decidability and Complexity*

The topic of the talk will be first-order predicate logical theories of the real numbers. We will survey classical results on decidability and complexity. Based on this, we will argue that in many contexts it makes sense to move beyond questions of decidability and complexity, and re-formulate such questions in terms of notions such as perturbation and robustness.