

# Ústav informatiky Akademie věd České republiky

Pod Vodárenskou věží 2, 182 07 Praha 8

ÚI AV ČR ve spolupráci s Odbornou skupinou pro logiku, pravděpodobnost a usuzování  
České společnosti pro kybernetiku a informatiku

pořádá

online přes systém Zoom

## Seminář aplikované matematické logiky

který se schází **ve středu v 16.00 hod.**

*Program na listopad 2020:*

4. 11. *Tommaso Moraschini, University of Barcelona*  
**On Equational Completeness Theorems**

A logic is said to admit an equational completeness theorem when it can be interpreted into the equational consequence of some class of algebras. Even if the vast majority of completeness theorems in the literature are of this form, it is known that there are logics lacking any equational completeness theorem. Despite the simplicity of this notion, intrinsic characterizations of logics with admitting an equational completeness theorem have proved elusive. This is partly because equational completeness theorems can take unexpected forms, e.g., in view of Glivenko's Theorem, classical propositional logic is related to the variety of Heyting algebras by a (certainly nonstandard) equational completeness theorem. As it happens, nonstandard equational completeness theorems of this form are ubiquitous.

In this talk, we present a characterization of logics with at least one tautology (resp. locally tabular logics) admitting an equational completeness theorem. For a protoalgebraic logic, this amounts to the demand that there are two distinct logically equivalent formulas. While the problem of determining whether a logic admits an equational completeness theorem will be shown to be decidable for logics presented by a finite set of finite matrices and for locally tabular logics presented by a finite Hilbert calculus, we shall see that it becomes undecidable for arbitrary logics presented by finite Hilbert calculi. The undecidability result persists even if we restrict to equivalential logics.

A draft collecting these observations is available online at <http://uivty.cs.cas.cz/moraschini/files/submitted/equational.pdf>

18. 11. *Kentaro Yamamoto, ICS CAS*  
**The combinatorics of finite Heyting algebras  
and the topological group of the automorphisms  
of their limit**

There are several results linking combinatorial properties of Fraïssé classes, certain classes of structures having the amalgamation property, and topological properties of the automorphism groups of their limits. In this talk, the speaker's work in progress on one instance of research in this vein, which is on the Fraïssé class of finite Heyting algebras will be presented. This class is not *uniformly* locally finite unlike most other examples considered in this vein of research. It will be shown that our automorphism group is non-isomorphic to

existing examples and that it is non-amenable. At the end of the talk, future research ideas pertaining to the Ramsey property of the class and, equivalently, the extreme amenability of the automorphism group will be discussed.

Další informace o semináři naleznete na <http://www.cs.cas.cz/logics/seminar.html>.