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

v seminární místnosti ÚI AV ČR - místnost č. 318
(stanice metra C Ládví)

Seminář aplikované matematické logiky

který se schází **ve středu v 10.00 hod.**

Program na květen 2017:

3. 5. 2017 - *Tommaso Moraschini*
An introduction to Abstract Algebraic Logic I

Abstract algebraic logic is a theory which aims to provide tools and techniques for the uniform study of arbitrary propositional logics, understood as substitution invariant consequence relations defined on the set of formulas of arbitrary algebraic language.

One of the main achievements of the theory is the discovery that, even at this high level of generality, it is possible to individuate some recurrent patterns in the behavior of the relation that logics enjoy with their natural matrix-based semantics. This observation led to the construction of the so-called Leibniz and Frege hierarchies, in which logics are classified according to some of these patterns. More precisely, logics are classified in the Leibniz hierarchy according to properties related to the definability of their truth predicates and of logical equivalence, while the Frege hierarchy classifies logics according to general replacement principles. A remarkable feature of the classes of logics in the Leibniz hierarchy is that they are characterized by means of the order-theoretic behavior of the Leibniz operator, which is a map defined for every algebra and independent from any logic.

In this series of talk we will present an introduction to the basic ideas of abstract algebraic logic with particular attention to the theories of the Leibniz and Frege hierarchies. The prerequisites of the lectures consist in a minimal knowledge of universal algebra and algebraic logic.

The course is tentatively organized in the following four blocks, of which the last three are mutually independent.

Block 1:

- general matrix-semantics for arbitrary logics - basics of the theory of algebraizable logics - characterization of algebraizability in terms of the Leibniz operator

Block 2:

- generalization of algebraizability to M-sets, where M is a monoid - examples of different algebraizations, e.g. order algebraizability and algebraization of Gentzen systems - examples of transfer theorems, e.g. Beth definability vs epimorphism surjectivity

Block 3:

- overview of the Leibniz hierarchy - characterization of classes in the Leibniz hierarchy by properties of the Leibniz operator - characterization of classes in the Leibniz hierarchy by means of closure under class-operators

Block 4:

- overview of the Frege hierarchy - finitary selfextensional logics with a conjunction or the (uniterm) deduction theorem - relations with Kripke semantics

17. 5. 2017 - *Tommaso Moraschini*
An introduction to Abstract Algebraic Logic II

24. 5. 2017 - *Tommaso Moraschini*
An introduction to Abstract Algebraic Logic III

31. 5. 2017 - *Tommaso Moraschini*
An introduction to Abstract Algebraic Logic IV