

# Ústav informatiky

## Akademie věd České republiky

Pod Vodárenskou věží 2, 182 07 Praha 8

ÚI AV ČR ve spolupráci s Odbornou skupinou aplikované matematické logiky 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 ve 14.00 hod.**

*Program na duben 2014:*

2. 4. 2014 - *Petr Cintula:*

#### **Pavelka-style completeness in fuzzy logics with non-continuous connectives**

Pavelka-style completeness, a property relating degrees of provability and truth, was previously studied mainly in the context of logics with continuous connectives. It is known that in some other logics one can use infinitary deduction rule(s) to retain this form of completeness. The present paper offers a systematic study of this idea for fuzzy logics which expand MTL and are given by a fixed standard algebra. Besides exploring the structure of classes of all ‘reasonable’ expansions of these logics by rational truth constants we provide, for several prominent cases, axiomatizations of their minimal expansion enjoying Pavelka-style completeness.

9. 4. 2014 - *Matěj Dostál:*

#### **Intro to simplicial sets: Chapter 0, Section 0**

By trying to continue in the sequence (point, line segment, triangle, tetrahedron, ...), we arrive at the notion of a higher-dimensional simplex. Put heaps of different simplices together side by side and you get a simplicial complex. Generalising further and allowing ‘gluing’ two faces of a simplex together, we get the notion of a simplicial set.

Thus we work with things that are (1) geometric, (2) combinatorial in nature. What is worse: (3) they allow for a categorical treatment. We will look at the interplay of (1),(2),(3) to the extent to which the speaker understands it. Whence the title of the seminar arises.

23. 4. 2014 - *Matěj Dostál:*

#### **Commutativity of limits and colimits**

The notion of a (co)limit lies at the heart of category theory. Unfortunately, limits do not usually commute with colimits. This can be shown somewhat amusingly by inspecting that the equality  $(a \times b) + (c \times d) = (a + c) \times (b + d)$  does not always hold for natural numbers. There are, however, some types of limits and colimits that do commute with each other. Finding out for which types of limits and colimits this happens is important not only out of sheer curiosity, but also in applications of category theory. For example, sifted colimits are those colimits that commute with finite products. They play an extremely important role in categorical universal algebra. A characterisation of sifted colimits is known in the setting of ordinary category theory. When working in enriched category theory, we can characterise preorder-enriched sifted colimits. Our ultimate goal: characterise category-enriched sifted colimits. So far, this is a source of many headaches and not so many results.

30. 4. 2014 - *Petr Révay*:

### **Formalization of Hajek's BL in Isabelle/HOL**

Isabelle/HOL is the most widespread instance of interactive computer proof-assistant Isabelle. It allows to formalize high-order mathematical formulas as well as their proofs in a logical calculus. For this purpose, Isabelle/HOL uses the Isar functional language, which is strongly oriented to human-readability of the resultant code to obtain one of the main advantages of Isabelle - the formal verification understandable to all: to the computer, the user and wide mathematical community.

I would like to present you the results of my work on formalization of syntactic part of prof. Hájek's Basic Fuzzy Logic, respectively the construction of reasoning environment beginning with definitions of connectives of BL, going through the inductive definition of the provability relation, the axiomatization and resulting in proving some theorems in calculus and formalized proof of the local deduction theorem and the others required lemmas.