Report to the master's thesis 'Classification of (in)finitary logics' (author : Tomáš Lávička)

The presented thesis 'Classification of (in)finitary logics' consists of three parts.

In the first one, the basic concepts and well known results of the theory of universal algebra and the lattice theory are presented. The chapter culminates in the concept of the subdirect (i)reducibility of algebra and Birkhoff representation theorem.

The second part delineates a summary of completeness theorems of logics. Particularly, the third completeness theorem with respect to RSI and RFSI reduced models is presented.

The most important results are presented in the last part. The author applied an interesting observation concerning the third completeness theorem proof and then he used it when introducing new concepts of 'intersection-prime extension property of the closure operator Th' (briefly IPEP) and 'completely intersection-prime extension property of the closure operator Th' (briefly CIPEP). Firstly, the logics satisfying (C)IPEP possess a stronger version of the completeness theorem w.r.t. RSI (resp. RFSI) reduced models. Moreover, the author introduced a sophisticated example of the logic which does not satisfy the IPEP (but satisfies RSI-completeness). Consequently, it is proved that the introduced concepts are really new and thus it refines the hierarchy of logics (on the scale Finitary $\longrightarrow$ RSI complete).

The above mentioned results show a great technical competence and a remarkable degree of logical inventiveness of the candidate. The thesis is well written and contains only few typos or trivial mistakes (for example:

- Page 15, Definition 2.2.5, Line 4: ...$f(a \wedge^A b) = a \wedge^B b$ and $f(a \vee^A b) = a \vee^B b$... should be replaced by ...$f(a \wedge^A b) = f(a) \wedge^B f(b)$ and $f(a \vee^A b) = f(a) \vee^B f(b)$...,
- Page 15, Definition 2.2.6, Line 3:... $a \leq_A B$... should be replaced by ...$a \leq_A b$...,
- Page 17, Proposition 2.2.14., Line 5: ...$(a \to b) \wedge a = b$... should by replaced by ...$(a \to b) \wedge b = b$...,
- Page 17, Proposition 2.2.14., Line 6: ...$(a \vee b) \to c = (a \to c) \vee (b \to c)$... should by replaced by ...$(a \vee b) \to c = (a \to c) \wedge (b \to c)$...

and so on.)

Since the idea of the thesis is clear and its results are very persuasive, I do not have any comments. Only one question: Is there any condition requiered on (some) axiomatic system of a particular logic that satisfies (C)IPEP? Or alternatively, is there any way to recognize whether the (e.g., weakly implicative) logic (introduced by an axiomatic system) satisfies (C)IPEP?

In conclusion, the thesis complies with the requirements to a master's thesis so I recommend it to be classified as **excellent** (**výborně**).

Olomouc, October 31th 2015 doc. Mgr. Michal Botur, Ph.D.