SUPERVISOR'S REPORT ON BACHELOR THESIS

Název: Fully symmetric operations
Autor: Jan Kubica

Content

The thesis studies algebras that have symmetric operations of all arities. These algebras are relevant in the theory of constraint satisfaction problems (CSPs), where they exactly correspond to CSPs solvable by the so-called basic linear programming relaxation. The main result is that a three-element algebra has symmetric operations of all arities if it has symmetric operations of arities 1, 2, and 3. Consequently, the property is decidable for three-element algebras.

Evaluation

Topic. The topic is not covered by any lecture on the bachelor level. The student needed to learn some parts of universal algebra.

Original contribution. The technical core consists of two parts: a combinatorial lemma and its application to prove the main result. The proof of the combinatorial lemma is an original contribution of the student (we learned a posteriori that the result was already proved by M. Kozik). The application is based on an unpublished work of Z. Brady. A lot of details were fast or missing in his write up, so the complete proof presented in the thesis also required a substantial amount of work.

Mathematical quality. The results are nontrivial. The presentation is also nice, although it did require some effort to improve it to the final form.

References. All sources are correctly cited.

Summary

This is a very good thesis and I recommend the thesis be accepted.

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