



Review report of a final thesis

Reviewer: RNDr. Jiřina Scholtzová, Ph.D.
Student: Daria Objeleanskaia
Thesis title: Balancing Lemmata in Kernelization
Branch / specialization: Computer Science 2021
Created on: 10 June 2024

Evaluation criteria

1. Fulfillment of the assignment

- [1] assignment fulfilled
- [2] assignment fulfilled with minor objections
- ▶ **[3] assignment fulfilled with major objections**
- [4] assignment not fulfilled

This thesis studies the Equitable Connected Partition problem (ECP for short) which is computationally hard and challenging. The thesis starts quite promising, however, in later parts, some pieces of the text appeared to be missing. Therefore, the thesis is rather hard to follow and understand. Regarding the Assignment, I'm afraid, some parts were unfulfilled. Namely,

- * Study and describe the balancing technique of Mnich and Wiese
 - covered by Chapter 3 only with references
- * Describe the formalism of data-reduction techniques
 - discussed in Chapter 2, all right
- * Try to apply the balancing technique (propose a proof of balancing lemma) for (a special case of) Equitable Connected Partition for bounded vertex cover number
 - covered partially by Chapter 4
- * Discuss the possible research directions
 - covered very briefly by Chapter 5.

2. Main written part

58/100 (E)

The text of the thesis is well structured, the quality of language and presented ideas is very good. However, it gives the impression of being unfinished, especially in chapters 3 and 5. Also in other chapters, there are very good parts and parts which make a feeling that they were written in haste or not finished. E.g. introduction to Chapter 2 ends with the character ;, or Chapter 4 ends with the end of the proof without mentioning any conclusion or corollaries. The reader expects something more...

There are many typographical errors in the text, mostly in the missing math environment:

E.g. see the text of the page 3.

Also, time to time the references are missing (e.g. Theorem 2.20, Theorem 2.12 or rather Definition?) or on the wrong place, which makes more difficult to continue reading without going through the referred articles. The statements use notation which is not introduced or not well bounded (e.g. Definition 2.1, N/K should be integer value, Definition 2.2 domain of r and relation to d not defined, Definition 4.1. $l \leq k$, and $|W_i| = |W_j| + 1$ does not include case with $+0$, etc.).

For this reason, it is hard to follow the ideas building through the text. In chapter 3, there are only references to work although I would expect much longer study here.

Regarding formal parts of the thesis, Czech abstract and keywords are missing, although they are obligatory parts of the thesis.

3. Non-written part, attachments 50/100 (E)

not included

4. Evaluation of results, publication outputs and awards 50/100 (E)

The results, as they are presented in this thesis, need some work on them before they can be considered as acceptable for publication.

The overall evaluation 54/100 (E)

The thesis is overall on a good level in terms of language and structure. However, it gives the impression of being "unfinished" and thus loses some of its quality. Some points of the assignment are not sufficiently discussed, as was required by the supervisor. Some details were described above.

Despite my comments, I recommend the thesis for defence, although I do not suggest such a good grade that this thesis would deserve after a more detailed revision. Now I classify it only as sufficient (E).

Questions for the defense

Could you sum up the main results from Chapter 3? Can you explain in more detail one selected lemma regarding balancing technique?

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.