

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	Graph-Based Simplex Algorithm for Discrete Energy Minimization .
<b>Author's name:</b>	<b>Dmitrii Mikhailov</b>
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Cybernetics
<b>Thesis reviewer:</b>	Karel Zimmermann
<b>Reviewer's department:</b>	Faculty of Mathematics, and Physics, Charles University.

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b> <i>How demanding was the assigned project?</i>	<b>ordinarily challenging</b>
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<b>Fulfilment of assignment</b> <i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	<b>fulfilled with minor objections</b>
More large test examples should be computed.	

<b>Methodology</b> <i>Comment on the correctness of the approach and/or the solution methods.</i>	<b>correct</b>
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<b>Technical level</b> <i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	<b>C - good.</b>
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<b>Formal and language level, scope of thesis</b> <i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	<b>D - satisfactory.</b>
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<b>Selection of sources, citation correctness</b> <i>Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?</i>	<b>B - very good.</b>
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<b>Additional commentary and evaluation (optional)</b> <i>Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.</i>	
Please insert your comments here.	



### III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

The author investigates the minimum energy assignment problem, which is in general an NP-hard combinatorial problem. The problem can be approximately solved by simplex linear programming relaxation. A disadvantage of this approach in case of large problems are huge memory requirements. To avoid this problem the author proposes to use a graph-based version of the simplex algorithm. The author showed a good knowledge of various approaches to the minimization problem and implemented the alternative graph-based simplex method, which may be more efficient for large problems than the relaxation method. It remains to test sufficiently large examples to find out under which conditions or for which types of problems the proposed method is better. This is not contained in the Thesis, but it should be a subject of future research.

*A question to the author.*

Solution methods of some (usually NP-hard) problems have huge memory requirements like the relaxation method mentioned in this thesis. Alternative methods developed to remove (avoid) this problem may have instead high requirements as far as the computational time is concerned (so called "curse of dimensionality" in Bellman's dynamic programming). Do you observe something like this for some classes of problems if you compare the relaxation method with the alternative graph-based solution approach, which you propose in your thesis?

The grade that I award for the thesis is **C - good**.

Date: **19.8.2021**

Signature: