

I. IDENTIFICATION DATA

Thesis title:	Entropy Maximization Under Entropic Constraints
Author's name:	Anna Ibatullina
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Computer Science
Thesis reviewer:	Ing. Mgr. Jaroslav Hlinka, Ph.D
Reviewer's department:	Ústav informatiky AV ČR

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The assigned tasks were challenging for the following reasons. 1) The student had to study many new mathematical concepts, namely advanced concepts related to entropy maximization in information theory. 2) The main assigned problem, the computation of connected information, counts among important open research problems. 3) The student had to learn new programming language (Julia) to implement the solution.	

Fulfilment of assignment	fulfilled
<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>	
All items 1.-4. in the guidelines were fulfilled. In particular, the optimization problem and its LP approximation are clearly presented and specified. The implementation is available on GitHub together with commented examples of use of the developed Julia package. The quality of approximation was tested on fMRI data from one of the sources cited in the thesis.	

Activity and independence when creating final thesis	A - excellent.
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.</i>	
Anna learned new concepts quickly and after several rounds of discussions she was able to implement the proposed approximation method. She worked independently and continuously progressed towards the final version of thesis.	

Technical level	B - very good.
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The technical level of the thesis is very good. It contains all the necessary details to understand the formulation of the nonconvex entropy maximization problem. The implementation on Github contains many useful examples how to use the functions in the package to compute main information quantities. I have one minor objection to the presentation of Yeung-Zhang inequalities. In fact there are 12 of them and they are not enumerated correctly in the thesis.	

Formal level and language level, scope of thesis	A - excellent.
<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>	
The thesis contains the necessary background to understand the main problem and its formulation. It proceeds from the introduction to main information-theoretic concepts to the mathematical representation of the entropy maximization problem given entropic constraints on marginals. The author has a good command of English.	

Selection of sources, citation correctness**A - excellent.**

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?

The list of references contains all important references dealing with the subject and they are written in the standard way. The student's contribution, which is the clear formulation and statement of the (approximated) problem and the implementation, are clearly distinguished from the rest of the thesis, where the main concepts are introduced.

Additional commentary and evaluation (optional)

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 am delighted to provide a positive review for the thesis submitted by Anna Ibatullina. Throughout my evaluation, I found the thesis to be technically sound but also a demonstration of the student's ability to learn new concepts. The bachelor thesis is the first step towards a paper we plan to finish in near future.

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.

The grade that I award for the thesis is **A - excellent**.

Date: **16.6.2023**

Signature: