

I. IDENTIFICATION DATA

Thesis title:	EEG Changes Assessment after Transcranial Alternating Current Stimulation
Author's name:	Svoboda Jakub
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Circuit Theory
Thesis reviewer:	Mgr. Jiří Hammer, PhD
Reviewer's department:	Neurologická klinika, 2. LF UK a FN Motol

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The project was certainly challenging. It included review of literature, experimental design, adjustments of the experiment, measurements of experimental data, their evaluation and interpretation.	

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>	
The assignment was fulfilled. A strong part of the project was the good theoretical preparation and careful experimental design preparation. Weaker part was the acquisition of a relatively few subjects, which must be solely to the COVID-19 pandemics and not to the student.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The methods, results and their statistical evaluation were sound and correct.	

Technical level	A - excellent.
<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>	
The thesis is well structured, ideas are very clearly formulated. The implemented algorithms represent the cutting edge of neuroscientific research. The interpretation of the results is, however, slightly weaker, which may be due to the small sample size of the measured subjects.	

Formal 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 is very well written, in high-quality English, which should be commended. Especially the general introduction and the methods are very well structured, logical and comprehensive.	

Selection of sources, citation correctness	B - very good.
<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>	
The citations are correct and distinguish the original work from earlier findings. However, there are not many citations in the Discussion and Conclusions, which does not put the study into the broader context of other published results.	

Additional commentary and evaluation (optional)
<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>

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 thesis is very well written, especially Introduction and Methods. The implemented and used algorithms are complex and up-to-date well in line with recent trends in neuroscience. Original results are presented and statistically evaluated. Given the circumstances of the COVID-19 pandemic, it was probably not possible to squeeze out the full potential of the study, which included also experiments with human subjects. This then very slightly negatively influenced the latter part of the thesis – Results and Discussion.

Questions:

1) Which neural network is thought to be activated during resting state? Which frequencies would you use to activate this network and why?

2) It is quite likely that the effect of tACS decays in time after the end of stimulation. Can you show if and how fast the PSD in the delta band decays in time after the end of tACS? Or at least suggest a modification of the data analysis to investigate such a (hypothetical) decay?

3) In chapter 5 you write that you want to explore “if the application of tACS over multiple sessions would induce some long-term changes in the brain”. Do you see any ethical issues in doing so?

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

Date: **28.5.2021**

Signature: