

I. IDENTIFICATION DATA

Thesis title:	Analysis of overnight electrophysiological recordings from deep brain stimulation
Author's name:	Adam Jeřábek
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Circuit Theory
Thesis reviewer:	Michal Novotny
Reviewer's department:	Department of Circuit Theory

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The student had to familiarize himself with Parkinson's disease and the mechanisms of sleep. From the technical perspective, the student analyzed signals obtained by deep brain stimulation and polysomnography. In the methodology, the student developed a fully automatic algorithm for detecting movement and investigated the relationship between local field potentials. Moreover, the student participated in the recording of the signals.	

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 student familiarized himself well with the clinical and technological aspects of the topic and performed a fully automated detection of movement activity and analysis of local field potentials and motor activity during sleep. Moreover, the student was involved in signal acquisition, which can be considered an additive thesis value.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The student carefully searched for an optimal solution for peak detection and performed the appropriate statistical analysis.	

Technical level	C - good.
<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 technically sound, and the author developed and presented interdisciplinary technology based on signal processing, statistics, and neurology fields. However, some parts are treated superficially (mainly parts with minimal or zero merit of the student). These are presented at the cost of others, which should be described in greater detail. The explanations are mostly clear.	

Formal and language level, scope of thesis	C - good.
<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 study is organized logically, even though sometimes the text deviates from scientific writing to story narration. Some sections are only vaguely connected with the study's primary goal. Nonetheless, the student provided a reproducible description of his work using understandable language and satisfactory English.	

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 student showed he can work with scientific literature and distinguish state-of-the-art and his own merit. Some minor issues occurred, such as citing Prof. Jech's opinion with the same or even higher emphasis than scientific literature.

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.

Overall the thesis reached a high standard with practical implications for further research. The motivation can be strengthened, and the formal presentation can be polished. Still, the thesis has a logical genesis and presents a technologically and clinically valid approach in a replicable manner, and the occurring issues are primarily minor formal mistakes. Even though the study is mainly technological, the clinical discussion of results would be interesting.

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 grade that I award for the thesis is **B - very good**.

The student fulfilled the assigned goals and reached interesting results for the scientific community.

Question1:

Did the signals contain movement artifacts? If yes, how they affected the algorithm performance?

Question2:

Have you considered using non-parametric tests instead of t-tests?

Date: **2.6.2023**

Signature: