THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Utilization of DKI-MRI in patients with pharmacoresistant epilepsy due to focal cortical dysplasia**
Author's name:	Timur Abragimovich
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Circuit Theory
Thesis reviewer:	Doc.Ing.Daniel Jirák, Ph.D.
Reviewer's department:	IKEM exp MR unit

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **extraordinarily challenging**

How demanding was the assigned project?

The topic of this thesis was very challenging, at the level of a diploma thesis or maybe even higher

Fulfilment of assignment **fulfilled**

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 conclude that the objectives of the thesis have been met.

Methodology **partially applicable**

Comment on the correctness of the approach and/or the solution methods.

The student compared DKI metrics in patients diagnosed with cortical dysplasia at a site determined by structural MRI (T1W). Unfortunately, no MRI sequence(s) parameters are given. This is particularly lacking for DKI sequences as these sequence parameters can significantly affect outcomes. In addition, some parameters are given that are not explained, see table2.2: and the values used are not explained why they were set (such as ¨WARPING REGULARIZATION¨), In addition, the age of the patient group is significantly lower (most of them are children under 10 years old) compared to the control group (adults). I miss some explanation how this may affect the results.

Technical level **A - excellent.**

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?

In his thesis, the student described methods that are very difficult even for experienced radiologists. The thesis and its results show that the student knows these methods and is very well aware of the issues.

Formal and language level, scope of thesis **B - very good.**

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?

There are some typo, some words are missing in the sentences (such as white and grey MATTER), some wrong statements (such as: pulses are NOT characterized by b-value but gradients), MNI abbreviation is not given but in general it is very good, above standard average of bachelor thesis.

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?

Very distinguished work with adequate sources and bibliographic citations which met the standards.

Additional commentary and evaluation (optional)

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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.
The topic of this paper is really very challenging, students usually need more time to fully understand it. Also the analyses are very difficult. In addition, this work is really beneficial for the science of MR diffusion, it is new and I expect that some of the results will be used in real scientific outputs. The student has shown excellent skill. Therefore, it is a pity that the methodology is not complete - I am missing some important paragraphs. Also, in the introductory part I miss some explanations for the unfamiliar readers of this interesting work, e.g. the calculation of K (kurtosis tensor - 4 dimensions).

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.

I Considering the difficulty of the work, I am inclined to give it an excellent grade. However, I would like to know the answers to these questions:

1) Explain the dimension of the KURTOSIS TENSOR 3x3x3x3 and how they are measured/calculated
2) Discuss the influence of the significantly different ages of patients and controls on DKI
3) There are many normalizations. For example, images in Fig. 2.1. look really different. Please discuss the loss of information due to intensive normalization (MNI).

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

Date: **2.6.2024** Signature: