THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**CALCULATION OF INTEGRATED PROTECTION OF ELECTRICAL EQUIPMENT**
Author's name:	**Agata Kalganova**
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Economics, Management and Humanities
Thesis reviewer:	Ing. Jakub Ehrenberger, Ph.D.
Reviewer's department:	Department of Electrical Power Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **ordinarily challenging**

How demanding was the assigned project?

Please insert your comments here.

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.

Please insert your comments here.

Methodology **correct**

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

To set the protections, it is more appropriate to calculate the minimal short-circuit currents. In the work, the calculation of the three-phase short circuit was performed only, which is usually the maximal in most cases.

Technical level **B - very good.**

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?

There are a number of inaccuracies in the work related to short circuit calculations:

- For transformers, the star connection does not indicate whether the center of the transformer winding is grounded or not.
- Figure 17 shows the same values of positive and zero impedance for T1, but the connection of the secondary side of T1 is in a triangle.

Formal and language level, scope of thesis **A - excellent.**

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?

Please insert your comments here.

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?

Please insert your comments here.

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.

Please insert your comments here.

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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 deals with the design of the protection settings of a part of the electrical network and the economic comparation of two possible types of transformer differential protection. In the introduction, the principles of commonly used electrical protections and calculation of grounding system are suitably described. In the next part, calculation of grounding and calculation of short-circuit conditions of the mentioned part of the network are performed, on the basis of which a protection system is subsequently designed. The correctness of the setting of the proposed protection system is subsequently verified in the ETAP program. At the end of the work an economic comparison of digital and analog differential protection is performed.

The work is carried out successfully and the graduate presents the appropriate conclusions, the quality is reduced by only minor inaccuracies in the short-circuit calculations.

Questions:

1. Do you know any type of commonly used network protection element, where the analog protection principle still has its use?
2. Assuming that the center of the star winding on the secondary side of T2 is ungrounded, would it be appropriate to supplement the network protection system between T2 and T1 (Bus 13) in some way?

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

Date: **8.6.2021** Signature: