SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Development and optimization of a control algorithm for multi-mode hybrid powertrain**
Author's name:	**Bc. Štěpán Pance**
Type of thesis:	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine, and Railway Engineering
Thesis supervisor:	Rastislav Toman
Supervisor's department:	Department of Automotive, Combustion Engine, and Railway Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging

Evaluation of thesis difficulty of assignment.

The thesis assignment combines a theoretical research with a challenging implementation of a heuristic control algorithm into a GT-Suite hybrid powertrain simulation model. Student had to build and test 2 different modular simulation models of a multi-mode hybrid powertrain with different simulation approaches: outputs of one model informing the other model. Therefore, I find the assignment complex and challenging.

Satisfaction of assignment	fulfilled

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

The assignment was fulfilled without any objections.

Activity and independence when creating final thesis	A - excellent.

Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.

The student was very active and independent during his thesis creation, fulfilling all his time limits and agreed deadlines, regularly informing on the progress either via MS Teams calls.

Technical level	C - good.

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

The technical level of the thesis is good. Although the theoretical background is very detailed, well studied by the student, and then properly used in the practical parts of the thesis, the technical level of the thesis is lessened by the text itself. Explanations and descriptions of modelling assumptions, simulation inputs, or results are often a bit confusing and chaotic. So, the technical content is given, the presentation in the text needs refinement. However, the knowledge gained from the study is evident, the practical part is complex, and showing interesting results and trends.

Formal and language level, scope of thesis	D - satisfactory.

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The thesis's formal and language level is only satisfactory. The text is logically divided into different sections or chapters, although it is often difficult to understand and follow. There are also many confusing numberings, some undeleted or unfinished sentences, duplicate equations, references on attachments without numbers, figures not mentioned in text, abbreviations that are not introduced etc. The text needs refinement. The thesis length and scope are standard.

Selection of sources, citation correctness	A - excellent.

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished

from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.

Student uses relevant and current sources: scientific papers and publications. All the citations are distinguished from the student's original ideas; therefore, the citation ethics has not been breached.

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

The student proved with the presented master thesis his technical competence and ability of theoretical knowledge application during the development of a control algorithm for a distinct HEV, using and combining different approaches.

The thesis's overall complexity and amount of work done is high, although the level of the textual part lessens the final classification grade to good.

I evaluate handed thesis with classification grade **C - good.**

Date: **31.8.2020**   Signature: