SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Development of a virtual toolchain for Toyota Hybrid System powertrain NV assessment**
Author's name:	**Ivo Vodička**
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 coupling of different simulation and control models into one functional toolchain for powertrain NV assessment, with a detailed validation of the prepared toolchain on different levels: top level performance, low frequency dynamics, and high frequency dynamics. The final part also identifies some possible further improvements. I find the assignment very 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 active and very independent during his thesis creation, fulfilling all his time limits and agreed deadlines, regularly informing on his progress, usually via emails.

Technical level **A - excellent.**

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 excellent. The theoretical background shows possible sources of vehicle NVH and the ways of mitigating them. The knowledge gained from the study and company experience were properly used in the practical parts of the thesis, that takes the main part of the thesis: the toolchain development explanation and various steps of validation process.

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

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

The thesis's formal and language level is very good. The text is well arranged and logically divided into different sections or chapters, although it is sometimes a bit clumsy for reading. The thesis length is 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.

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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 NVH assessment virtual toolchain. The whole work covers a broad spectrum of competencies: simulation, experimental set-up, evaluation, and finally model validation. The thesis's overall complexity and high level of execution of different sub-tasks render the final classification grade of excellent.

I evaluate handed thesis with classification grade **A - excellent.**

Date: **29.1.2020** Signature: