THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	HIL simulation of driving cycles and its validation
Author's name:	Bc. Harshaan Singh
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	Ing. Jiří Vávra, Ph.D.
Reviewer's department:	Department of Automotive, Combustion Engine and Railway Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	**ordinarily challenging**
How demanding was the assigned project?	

Fulfilment of assignment	**fulfilled with major objections**
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.	

The theoretical (the literature search) part was carried out sufficiently and provides a meaningful overview of the state of the art digital communication networks used in modern vehicles.
Unfortunately, the practical part of the Thesis Report describing the HIL simulation was not carried out clearly.

Methodology	**partially applicable**
Comment on the correctness of the approach and/or the solution methods.	

The area of the thesis is extremely broad the reader is overwhelmed by lots of information, that is not too relevant to the thesis. The thesis report would deserve a better organization. It is not clear to the reader, what was the student's contribution and what was provided him by his supervisor and/or the company.
The practical part does not contain clear introduction, description of the work performed and conclusions to the student's part. The findings were not clearly and transparently analyzed neither presented.

Technical level	**E - sufficient.**
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?	

The description sections of the digital communication networks seem elaborated suitably and gives a sufficient overview of the modern networks in modern vehicles.
On the other hand, the technical description of the HIL components and functionality is extremely poor and sometimes confusing. There is obvious lack of understanding of the components and functionality of the HIL system.

Few examples:
The reviewer does not understand this statement: "During the vehicle operation, in a four-stroke engine, there are two steps of air intake, i.e. in a complete cycle, air flows inside the engine two times."

The student cites Heywood's textbook on the ICE Fundamentals. However, it looks he has not read it. His interpretation of the carbon balance for the CO_2 mass flow rate estimation resembles the elementary school problem solution.

In chapter 8 the interpretation of the simulation results and the comparison with the "real vehicle" values is presented. The student claims that the HIL results almost follow the real vehicle data. However, it is clearly visible that the graphs show different values and different trends.

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

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?

The thesis needs a language correction.

Selection of sources, citation correctness   **E - sufficient.**

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?

The list of references is carried out carelessly.
It needs to be pointed out that the student did not use the main literature source recommended by the thesis supervisor.

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, etc.

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.

Unfortunately, the contribution of the student's work is not clearly distinguished in the Thesis Report.
The logical structure and organization of the report is poor. The thesis needs a language and technical correction.
The calculations performed and data analysis are not technically sound.

The grade that I award for the thesis is **E - sufficient.**

Questions:

Can you describe a procedure of the assessment of the drive cycle vehicle fuel consumption for a) the real vehicle and b) the HIL system**?**

Can you describe carbon mass balance for the CO_2 emission assessment?

Can you describe the HIL system in terms of the implemented physical modeling and simulation time?

Date: **2.9.2020**   Signature: