

I. IDENTIFICATION DATA

Thesis name:	Development of a virtual car model and subsequent physical validation
Author's name:	Jakub Záhorský
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	Pavel Steinbauer, Ph.D.
Reviewer's department:	Department of mechanics, Biomechanics and Mechatronics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>Evaluation of thesis difficulty of assignment.</i>	
Student had to cover vast territory, ranging from ADAS systems, legal test requirements, technical test definition, vehicle modelling including software tool IPQ CarMaker, vehicle instrumentation, experimental vehicle testing.	

Satisfaction of assignment	fulfilled
<i>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.</i>	
The assignment is fulfilled. The required review of current approaches to dynamic system modelling is only covered on general level.	

Method of conception	correct
<i>Assess that student has chosen correct approach or solution methods.</i>	
The literature review is well organized and it is a good introduction to the topic of ADAC systems. The real world experiments are systematically described. The vehicle dynamic model created in CarMaker software is described a calibrated based on experimental data. However, internal structure of the simulation model is not very clear and most of the parameters are left with default values. Unfortunately, the purpose of vehicle simulation model is not clearly defined on technical level, so it is difficult to evaluate model quality.	

Technical level	B - very good.
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The thesis are well organized, can be used as starting references material about the subject. The selected validation tests are well selected and properly described so they can be reproduced. The simulation results correspond to experimental data very well.	

Formal and language level, scope of thesis	B - very good.
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
The stylistics, grammar are good, considering author is non-native speaker. Formal and graphical quality of the thesis is very good.	

Selection of sources, citation correctness	A - excellent.
<i>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.</i>	
The used sources are relevant, correctly cited. Only ISO norms should be cited including the year of publication.	

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

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

The thesis cover ADAS systems description very well. The experiments definition and results are well described. The simulation model internal structure is not described in detail. The modelling objective, purpose of calibrated model is not clear from the thesis. However, overall quality of the thesis is very is good and I recommend them for the defense.

Questions to discussed:

- How will the resulting vehicle model be used? Should it interact with real world ADAS systems?
- How existing ADAC systems in the measured vehicle influence vehicle dynamics? E.g. in slalom test, was ESP activated? Is this treated in the calibrated simulation model?
- Is accuracy of ADAC sensors (pages 17-18) known?
- Does the simulation model use constant steering ratio? Many vehicles have this ratio velocity dependent.

I evaluate handed thesis with classification grade **B - very good**.

Date: **22.1.2019**

Signature: Pavel Steinbauer, Ph.D.