CZECH TECHNICAL UNIVERSITY IN PRAGUE
Faculty of electrical engineering
Department of Control Engineering
Karlovo náměstí 13, 121 35 Praha 2, Czech Republic

Bachelor thesis opponent's review

Master thesis: **Vehicle slip ratio control system**
Author: **Jan Kučera**
Thesis supervisor: **Ing. Tomáš Haniš, Ph.D.**
Thesis opponent: **Ing. Petr Liškář**

	Rating (1 – 5) (1 = best; 5 = worst):
1. Fulfillment of assignment requirements:	3
2. Systematic solutions of individual tasks:	3
3. Ability to apply knowledge and to use literature:	2
4. Thesis formal and language level:	1
5. Thesis readability and structuring:	1
6. Thesis professional level:	3
7. Conclusions and their formulation:	3
8. Final mark evaluation (A, B, C, D, E, F):	C
verbal:	good

Brief summary evaluation of the thesis (compulsory):

Given Bachelor thesis fulfills all necessary formal aspects, nevertheless some assigned requirements should have been elaborated much deeper. It is well structured, organised and easy to read.

Minor mistakes may be seen in the introduction already. For example Center of Pressure of the Single-track model of an electric formula is not at the same height above the ground as the Center of Gravity. Twin-track models does not serve only to introduce left and right wheels, but rather to introduce roll and pitch moments.

But the thesis is missing an important part of its third task, which should be „Algorithms verification on simulation based environment." There may be found only two plots related, still it seems the virtual model was apparently used only to visualize the data obtained during the drive tests rather than to controller calibration, validation or optimization purposes. There are not any outcomes from the linearized model comparing it with a non-linear one neither.

There are missing explanations or justification for a various phenomenons. For example root-cause of the slip ratio and torque oscillation that were identified during the drive test was not systematically investigated. It maybe due to the low-fidelity of the vehicle or tire model, due to the missing pitch moments, incorrect P or I constants or switching between the different modes of

speed and slip ratios or other factors. The comments only reflects the on-vehicle measurement issues.

The result of the thesis demonstrates the proposed system may improve the longitudinal dynamics of the vehicle, but remains unfinished notably due to missing the principal benefits of the model-based-design and a lack of initiative of the author.

Questions:

1. How did you select the target value of the reference signal in Fig. 5.4 and why it is oscillating?
2. How did you verified the effects of switching between different P and I of the linearized model?

Date: 9th June 2019 Signature: Petr Liškář

Notes:

1) The total thesis evaluation needn't be determined by the partial evaluations average.
2) The total evaluation (item 8) should be from the following scale:

excellent	very good	good	satisfactory	sufficient	insufficient
A	B	C	D	E	F