I. IDENTIFICATION DATA

Thesis name:	**Using an embedded QP solver for automotive applications**
Author's name:	**Barinov Aleksandr**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	Ing. MSc. Martin Klaučo, PhD.
Reviewer's department:	Institute of Information Engineering, Automation, and Mathematics, Slovak University of Technology in Bratislava

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment   **challenging**

Evaluation of thesis difficulty of assignment.

The assignment poses challenging tasks and questions for the student to solve. Merging the control algorithms with machine learning plays essential role current in many research domains.

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 reviewer is confident, that all points from the assignment have been fulfilled.

Method of conception   **outstanding**

Assess that student has chosen correct approach or solution methods.

The student has chosen state of the art programming tools and libraries in Python for reinforcement learning such as MuJoCo, Pybullet, OpenAI Gym, which demonstrates capabilities of the student to fulfill the thesis tasks.

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 quality of the thesis is excellent in terms of choosing the tools, used references and presentation of the results within the document. Furthermore, the reviewer considers this thesis a s baseline for further research.

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 is written in a consistent way; however, the student did not focus on details such as figure placing, table placing or equation numbering. The thesis contains huge portions of white spaces on pages. Furthermore, chapters often start with figures which degrades the overall feeling from the thesis.

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.

The thesis contains ample set of references, however I'm missing one of the biggest contributors in the domain of bridging the machine learning with control theory in the automotive domain, and that is the work of Francesco Borrelli (https://me.berkeley.edu/people/francesco-borrelli/).

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.

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.

In general, I find the thesis of good quality with focus on detail. The topic of incorporating machine learning with control applications in the automotive domain is of vital importance nowadays.

Questions for the student:
1. Explain the reason for downgrading the 4WD to 2WD (Section 4.1). What are theoretical and practical implications of such a downgrade.
2. Discuss the mathematics behind the trajectory generation in Figure 5.1. Specifically, what kind of curves are considered as good trajectories? Do they have to be smooth and twice differentiable?
3. Characterize the final learned control policy in terms of the dimension of the neural network, its activation functions etc.

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

Date: **7.6.2022**   Signature: