THESIS SUPERVISOR'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Open Rapid Control Prototyping, Education and Design Tools**
Author's name:	**Dion Beqiri**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Electrical Power Engineering – K13115
Thesis reviewer:	Ing. Pavel Píša, Ph.D.
Reviewer's department:	Department of Control Engineering – K13135

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — **challenging**

How demanding was the assigned project?

The extension of the pysimCoder blocks implementation, editor and code generator to support vector signals is complex task. Student invested significant effort to familiarize with pysimCoder. The project is relatively young without bigger team behind and lot of the mechanism are not documented yet. The thesis text is significant contribution to documenting the project. Not only Python testing on the desktop computers has been planned, but even testing and extension of support and preparation of demonstrations on GNU/Linux XilinX Zynq based MZ_APO target as well as on constrained NuttX RISC-V based device was included. Student has had to handle build systems, peripherals hardware and operating systems of all these targets.

Fulfilment of assignment — **fulfilled with minor 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.

It has been negotiated from the start, that vectors support is experimental prototype work to check what is possible and where changes are necessary. Complete generic dimensions marching algorithm would be supported the best by symbolic constrains description and computer algebra system (CAS) equivalent solver probably, which are tasks out of time frame of the bachelor theses. That is why basic simpler mechanism and rules for dimension propagation has been chosen by student. Models based on blocks conforming to these rules has been demonstrated, but expected minimal set of the code generators extensions has not been updated to reflect wide set of Michal Lenc changes accepted into mainline. On the other hand, Dion Beqiri's new blocks for DC and PMSM motor control and experiments for MZ_APO and NuttX has been submitted and accepted into mainline as well as more demonstration models into an official examples repository.

Activity and independence when creating final thesis — **A - excellent.**

Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.

The student has started with the pysimCoder familiarization in advance. He prepared more blocks for MZ_APO target during this period. He has proposed and implemented his own approach for simpler but realistically doable vector signals support. He actively exchanged information with Michal Lenc working in different area of pysimCoder support as well as realized experiment with PMSM control on constrained ESP32C3 target with CAN communication in cooperation with Jan Charvát, which CAN driver functionality in real and real-time model has been demonstrated that way.

Technical level — **A - excellent.**

Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?

Student used and deepened knowledge in programming techniques, operating systems, processor applications and their

use to realize control systems. The text of the thesis is sound source of documentations for future reuse and continuation from his work.

Formal level and language level, scope of thesis **A - excellent.**

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 students language skill are at excellent level. He proved communication skills during work with other related Open Technologies Research Education and Exchange Service projects local members as well as with foreign experts.

Selection of sources, citation correctness **A - excellent.**

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 related sources are references and work provides valuable documentation for many project components.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

The work provides valuable extension to the pysimCoder target hardware support. Highly valuable analysis and experimental prototype for the vectors support has been documented. Little drawback is that initial, but agreed upon, minimal generator extension to annotate actual unity scalar signals dimensions has not been updated to the actual project mainline version. On the other hand huge changes accepted into mainline come during time when the student was finishing his work and focuses mainly on real demonstrations and documentation.

Generally I value Dion Beqiri's attitude to the work and study and I believe that he is and will be valuable member of development and or research teams who is able to bring in new technologies and approaches.

The grade that I award for the thesis is B - very good.

Date: **7.6.2022** Signature: