THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Optimization of parameters of selected controllers using GEA**
Author's name:	**Petr Siblík**
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Automation and Instrumentation Engineering
Thesis reviewer:	Ing. Adrian Saldanha
Reviewer's department:	Machine and Process Control

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

The assigned project is quite specific and reasonably challenging. One of the challenging aspects of the task was to apply the optimize the parameters of the controller in a more robust and dependable manner and the thesis has achieved this task successfully.

Fulfilment of assignment **fulfilled**

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 main aim of the thesis was to optimize the parameters of the discrete controllers, and this has been fulfilled. A minor detail which could have been covered in more detail is the selection of the weights of the coefficients as these coefficients have been preset by the author and it does not provide an explanation about tuning these parameters depending on the varying control objectives present in real situations.

Methodology **outstanding**

Comment on the correctness of the approach and/or the solution methods.

The methodology and the flow of the thesis is excellent. The thesis follows from a previous study and uses results from the already existing work to further develop the concept and the application. In doing so, the student has achieved solving some of the unfinished problems from the prior study while also improving the robustness of the approach.

Technical level **B - very good.**

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 thesis is technically sound. The student used a number of concepts involving different parts of automatic control theory and explained the same clearly. Additionally, the MATLAB and Simulink files are clean and easy to use and suitable for further expansion of the ideas for future study.

Formal 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 notations and the formalisms have been used properly and the ideas have been developed methodically. The student introduces the preliminary concepts in the beginning chapters and later applies the same by including the cross-references. The technical language in the thesis is indeed clear and easily understandable.

Selection of sources, citation correctness **B - very good.**

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 sources for the student's work were adequate and were referenced correctly. The student's work does distinguish itself from the earlier work and in fact, it properly connects the previous work on this topic.

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, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

The thesis is clear and concise. The topic applies a universal optimization approach to a specific task of controller parameter estimation and subsequently justifies the effectiveness of the same in solving the specified problem. The student's knowledge on the topic is very good and he does provide detailed explanations about key concepts where necessary.

As part of the main objective, the above work is indeed complete, and the student has theoretically and practically achieved his target. Nevertheless, there does seem to be a few important open questions about the methodology, such as the practicality of this method under real circumstances or the drawbacks of using this method in real-world applications.

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.

The thesis is detailed and has been developed logically and systematically. The different chapters are coherent and well connected with each other while also being cross-referenced correctly, and the theoretical concepts in use are explained clearly and in sufficient detail.

Additionally, the thesis pays due attention to the use of the different variants of the controller and the impact of each parameter of the controller which are later estimated by means of the algorithm. A key point in this thesis is that it uses a few basic results from the previous work, thus avoiding duplication and instead focuses on solving some of the unsolved problems left from the previous work while also further developing the concept by improving the robustness of the approach. The thesis does solve these problems successfully. Added to this, the MATLAB/Simulink files are clean and easy to use and are perfectly suitable for future expansion of the ideas in this topic. Finally, to make a firm case of the methodology used, the student has successfully implemented the procedure on a real process and provides sufficient explanation of the results obtained.

While the thesis is in essence complete, there is room for further expansion of the conclusion as it still leaves a few open questions concerning issues such as the practicality of this method, its limitations, the conditions of use, future work on the topic, etc.

As a whole, the thesis can be classified as 'Very Good'.

Questions:

1. What range of values can the coefficients C_e, C_u and C_{du} take and on what basis do we parameterize these coefficients eg: What values do we use if we want to improve the robustness of the controller? (Refer table 3)

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

Date: **25.8.2021** Signature: