**MASTER'S THESIS EVALUATION**

**Thesis Opponent**

Západočeská univerzita v Plzni
Fakulta aplikovaných věd
katedra kybernetiky

**Master student:** Bc. Pavel Zach          **Department:** KKY

**Thesis name:** Systematic control of metabolite availability using models and methods of synthetic biology

| | Subject of the evaluation | Above average | Average | Below average |
|---|---|:---:|:---:|:---:|
| 1 | Linguistic form and final polishing of the text | ☐ | ☒ | ☐ |
| 2 | Form and content of the thesis | ☒ | ☐ | ☐ |
| 3 | Suitability of the used methods | ☒ | ☐ | ☐ |
| 4 | Processing and evaluation methods | ☒ | ☐ | ☐ |
| 5 | Correctness of the results obtained | ☐ | ☒ | ☐ |
| 6 | Own contribution | ☒ | ☐ | ☐ |
| 7 | | ☐ | ☐ | ☐ |

**Evaluation supplement, remarks, questions:**

The candidate has submitted an excellent Master's Thesis manuscript, in which style, language and structure are fully in line with the quality and quantity of the contributions and results obtained.

- Very good, logic and clear structure of the manuscript.

- Figures and captions are clear and overall of very good quality.

- English style and grammar is more than acceptable.

- With a spell checker, the candidate will be able to remove all typographical errors throughout the thesis.

In the following, some remarks with the opponent's appreciations are presented:

In the Thesis objectives, the author explains that the idea is to develop methods for operon regulation using "metabolic intermediate measurements", and this is no fully in agreement with all the posterior content of the thesis, in fact the Tryptophan operon, uses measurement of the final metabolite of the metabolic pathway for its own control and not intermediate metabolites. It is true, that eventually it will be possible to design control structures involving not only the final metabolite but also the intermediate ones, but this is not clearly explained in the manuscript.

Along the modeling of the designed adaptors, the models proposed are interesting but rather simple in order to reflect the complexity of the system. This is a good first approach, but is in the author's mind to go for more ambitious models, for example, to characterize also the effect of the codons and length of the sequence in the termination efficiency?

With respect to the experimental validation, the author says that $20\mu M$ of IPTG correspond to partial (%50) induction, where this data comes from, there is no proper citation.

It is useful in order to replicate the results or when trying to use the author's models, to have a table with parameter values, together with the information about where each value was taken from (references), in order to use them wisely.

The application to real-life system has been shortly addressed in the context of the thesis -this would have required a very significant amount of time- but it appropriately mentioned that this would be an interesting direction for further research and it makes an interesting point for the use of synthetic biology for biotechnology applications.

| Fullfilment of the tasks assigned | | ☒ fully | ☐ partially | ☐ none |
|---|---|---|---|---|
| I recommend this thesis for a defense | | | ☒ yes | ☐ no |

| **Overall thesis grade** | ☐ excellent | ☒ **very good** | ☐ **good** | ☐ **fail** |
|---|---|---|---|---|

Name, surname, opponent's title: Alejandro, Vignoni, PhD.

Opponent's department (university): Control Systems Engineering Department, Universitat Politecnica de Valencia (SPAIN)

11/06/2014
Date

Signature

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S ORIGINÁLEM**