

I. IDENTIFICATION DATA

Thesis title:	EV manager development
Author's name:	Jiří Jiráček
Type of thesis:	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Control Engineering
Thesis reviewer:	Kamil Dolinský
Reviewer's department:	Connected Vehicle, Garrett

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>How demanding was the assigned project?</i>	
The assignment was adequate for bachelor's thesis. It consists of reviewing the state-of-the-art for EV (electric vehicle) management system. After understanding the state-of-the-art, assignment was to prepare the requirements and associated tests for the EV management system. Then to implement the EV manager. And finally, to test and validate EV manager implementation with respect to the requirements and test specification.	

Fulfilment of assignment	fulfilled with major objections
<i>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.</i>	
First task was to review existing EV management systems. To understand the main functions such a system needs to fulfill.	
<p>I find this review very short and shallow. Author states that because every company is implementing their own management system there is no general method to design EVM (electric vehicle manager). Author identifies three basic functionalities that the EVM should cover:</p> <ul style="list-style-type: none"> • Creating a technical safety concept, both on hardware and software level. • System integration and testing. • Safety validation. <p>Based on these points, the author chooses following goals for the thesis:</p> <ul style="list-style-type: none"> • Designing EV manager for FSVDVP. • Implementing a MATLAB & Simulink based framework. • Testing and validating the implementation. <p>It is not clear what the system means. It is the whole experimental platform, or just the integrated SW or just the EVM SW?</p> <p>Also, I find the state-of-the-art somewhat lacking more detail.</p>	
Second task was to define system requirements and test requirements.	
<p>Definition of system requirements is missing in my opinion. Partially this topic is covered, for example, system architecture is described. However, there is not a single functional requirement (i.e. requirement to be tested) defined in the thesis. The problem is that the requirements are not clearly identified. And it is not possible to distinguish what is a description of the system and what is a functional requirement that needs to be tested.</p> <p>Definition of test requirements is not given in detail in the thesis. In chapter 4.2 there are several tests described and I expect the detailed test definition is given elsewhere (e.g. in the Simulink test suite). However, tests are not linked to system requirements -- mainly because there are no functional system requirements, nor there are any functional SW</p>	

requirements defined by a label or number. Therefore, it is difficult to understand what is a requirement and what is not a requirement and how many requirements there actually are.

Third task was to implement the EV manager system for experimental platform

The author provides the detailed description of the state-flow implementation in Simulink.

Obviously, the system was tested in chapter 4 which is very positive. However, was this system deployed to the experimental platform? Was there any system integration performed?

The last task was to Test and validate the implementation with respect to system requirements and test specification.

As I already mentioned system requirements were not clearly defined (i.e. there are no requirements to refer to).

The author state that: "In Chapter 3, system and test requirements were defined, and implementation and the overall concept of developed EVM were presented."

Would the author be able to show a system requirement or test requirement?

What does the author understand under the word system requirement? Does the author understand the difference between system requirements and SW requirements? Would it help to divide these requirements into these categories (i.e. system and SW)?

Methodology

correct

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

I think that the approach taken by the author is correct. The author first studied state-of-the-art of EVM. Then the author described the system architecture to understand the interactions happening in the system. Then author implemented EVM, documented it and finally tested it in simulation.

Unfortunately, the research of the state-of-the-art was quite short and shallow. System requirements are not defined, and the implementation was not tested on the experimental platform.

Technical level

C - 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?

I think technically this thesis is correct. The usage of Simulink state-flow is adequate because Simulink and model-based design is widespread in the automotive industry. Also, the plan to use embedded coder to deploy the SW to the experimental platform is in alignment with the industrial trends. Finally, testing the solution using Simulink test suite is also correct.

The main drawbacks are that I did not see any deployment to real-time embedded system.

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?

Language level is excellent. Thesis is written clearly. Figures are presented clearly. Minimum grammar errors.

Selection of sources, citation correctness

C - 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?

I can imagine more research on the EVM topic and more relevant references. Also, probably references to other students and researchers that worked on relevant topics for this experimental platform (e.g. related work for DBW, BBW, BMS, etc.).

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.

Overall, the topic of EV management system is relevant. The text is well written and easy to read. The impact of the work would be greater if the integration with relevant subsystems and deployment to experimental platform was carried out. Nevertheless, creating an EVM is an important step for creating a working EV experimental platform.

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

Overall, the topic of EV management system is relevant. The text is well written and easy to read. The impact of the work would be greater if the integration with relevant subsystems and deployment to experimental platform was carried out. Nevertheless, creating an EVM is an important step for creating a working EV experimental platform. The research on the state-of-the-art could be more thorough. The definition of the system and test requirements could have been more specific -- i.e. there are no labels and it is not distinguished what is a requirement and what is just a description. Also, it should be explicitly stated which requirements are needed to be tested (i.e. they should be marked as functional).

1. *It is not clear what the "system" means when referring to system requirement. It is the whole experimental platform, or just the integrated SW or just the EVM SW?*
2. *What does the author understand under the word system requirement?*
3. *What does the author understand under the word test requirement?*
4. *Would the author be able to show a system requirement or test requirement?*
5. *Does the author understand the difference between system requirements and SW requirements? Would it help to divide these requirements into these categories (i.e. system and SW)?*
6. *Are there any requirements that EVM has on other SW components (DBW, BBW, BMS) or their interfaces?*
7. *Does the author know what V-model framework in ASPICE is? Would it help to mention it in the introduction?*
8. *Was EVM SW deployed to the experimental platform? Was there any system or SW integration performed?*

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

Date: **3.6.2022**

Signature: