



## Master thesis supervisor's review

**Master thesis:** Modelling of Synchronous Reluctance Motor

**Author:** Emre Şakar

**Thesis supervisor:** Ing. Petr Liškář

Rating (1 – 5)  
(1 = best; 5 = worst):

- |  |                                |
|--|--------------------------------|
| 1. Fulfillment of assignment requirements:                     | <input type="text" value="3"/> |
| 2. Self-reliance and initiative during the thesis solution:    | <input type="text" value="1"/> |
| 3. Systematic solutions of individual tasks:                   | <input type="text" value="2"/> |
| 4. Ability to apply knowledge and to use literature:           | <input type="text" value="3"/> |
| 5. Collaboration and consultations with the thesis supervisor: | <input type="text" value="1"/> |
| 6. Thesis formal and language level:                           | <input type="text" value="1"/> |
| 7. Thesis readability and structuring:                         | <input type="text" value="2"/> |
| 8. Thesis professional level:                                  | <input type="text" value="3"/> |
| 9. Conclusions and their formulation:                          | <input type="text" value="2"/> |
| <b>10. Final mark evaluation (A, B, C, D, E, F):</b>           | <input type="text" value="C"/> |
| <b>verbal:</b>   | good                           |

### Brief summary evaluation of the thesis (compulsory):

Given Master thesis fulfills all necessary formal aspects and assigned requirements. It is relatively well structured, organized and easy to read with some flaws.

At the beginning, general introduction to the electric motors and motivation to pick-up a Synchronous Reluctance Machine (SynRM) is presented.

There is a complex description of the mathematical model. However, I miss transparent application example of the selected equations into the Matlab/Simulink blocks. Block diagram of SynRM in d-q reference frame is shown as an entire model as far as in Chapter 4 as a part of the simulation results.

Test cases for both controllers, i.e. Sensorless Speed Controller and MTPA are presented by a demanded torque profile at given fixed speed. Combined variable speed and torque profile or an interconnection of the model within some external mechanical system to prove stability of the model is missing. Model-in-the-loop simulation therefore remained unfinished.



Traction effort - speed curve of the SynRM is shown in the Figure 4.36 and would be very interesting to validate it with an experiment. Unfortunately, time schedule did not allow Mr. Şakar to add this experience in his thesis, but will be performed at EATON facility in Roztoky.

As a supervisor, I would like to highlight notably responsible approach of Mr. Emre Şakar, that could serve as an example.

From my side, there are two additional questions:

In chapter 3.1 of your thesis, you have neglected mechanical losses.

- How would you determine mechanical losses of your electric motor?
- How would you integrate mechanical losses into the model?

Date: 03.06.2019

Signature:



**Notes:**

- 1) The total thesis evaluation needn't be determined by the partial evaluations average.
- 2) The total evaluation (item 8) should be from the following scale:

excellent	very good	good	satisfactory	sufficient	insufficient
A	B	C	D	E	F