



Supervisor's statement of a final thesis

Student: Petr Dostál
Supervisor: doc. Dr. André Sopczak
Thesis title: Optimization of the Matching Criteria Between the ATLAS and AFP Detectors at CERN
Branch of the study: Web and Software Engineering

Date: 5. 6. 2020

<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
1. Fulfilment of the assignment	<u>1 = assignment fulfilled,</u> 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled
<i>Criteria description:</i> Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.	
<i>Comments:</i> Petr worked on a project involving large data sets recorded by the ATLAS experiment at CERN in line with his assignment. His thesis describes the objectives correctly and completely. As the analysis of the data has been developing, new aspects have been added, in particular cross-checks to ensure the correctness of the results. As stated in the assignment, a bonus is the application on simulated data, also this task has been completed. The method to optimize the matching of the information from two different detectors are applied on recorded data, and particularly the randomness of the matching was determined. In addition the method was applied on simulated signal data and the resulting detection efficiencies were determined.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
2. Main written part	90 (A)
<i>Criteria description:</i> Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies? Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 26/2017, Art. 3. Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.	
<i>Comments:</i> The thesis is concise and covers all parts of the assignment. The content is correct and well structured. Some aspects could have been explained in more depth, and discussions and comparisons been added. The lack of these more detailed discussions is compensated in the contents by having included the bonus aspect of application of the method to simulated data. In the simulated data Petr also correctly and with much self-initiative overcome technical problems related to incomplete simulated output which he successfully reconstructed from available information. The logical flow is coherent and all used information is correctly referenced. Software and copyrighted material was corrected used. Typography and his English language are very good.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
3. Non-written part, attachments	90 (A)
<i>Criteria description:</i> Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.	
<i>Comments:</i> The software development was a challenge as a part of the ATLAS experiment software infrastructure. Petr's software development required him to obtain detailed understanding of the ATLAS software in the particular section relevant to his project. The technology to store and analysis is based on ROOT ntuple, a new aspect he learned quickly and used it efficiently for his own software development. His software is also useful after the completion of his thesis and the results listed therein. In the future, his software can be used when the ATLAS recorded data or the simulated data are updated or extended.	

Evaluation criterion:

The evaluation scale: 0 to 100 points (grade A to F).

4. Evaluation of results, publication outputs and awards

90 (A)

Criteria description:

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

Comments:

Petr's results are important for the ongoing analysis as they demonstrate the effect of the uncertainties on the matching of the information from two detectors. They also show which detector has the leading uncertainty and in particular that systematic uncertainties are dominant. The results correctly quantify the different sources of uncertainties. The publication of results based on the ATLAS experiment data undergo a detailed scrutiny which is a lengthy process, therefore Petr's results will be included in a later publication. Petr has already included his results, and details that the results can be cross-checked, in a so-called internal supporting note which accompanies each ATLAS publication.

Evaluation criterion:

The evaluation scale: 1 to 5.

5. Activity and self-reliance of the student

5a:

1 = excellent activity,

2 = very good activity,

3 = average activity,

4 = weaker, but still sufficient activity,

5 = insufficient activity

5b:

1 = excellent self-reliance,

2 = very good self-reliance,

3 = average self-reliance,

4 = weaker, but still sufficient self-reliance,

5 = insufficient self-reliance.

Criteria description:

From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations (5a). Assess the student's ability to develop independent creative work (5b).

Comments:

Petr worked very enthusiastically on his project. He was eager to learn more about the particle physics aspects and the physics motivation. He understands well the need of this project to improve the detection significance combining the information of two different detectors. Petr also presented regularly at group meetings and was on time with his contributions on his part for intermediate status reports of the whole research project. His consultations and questions were always efficient and he understood quickly the new aspects. Petr has very good potential for a researcher and contributed with independent ideas and creative work.

Evaluation criterion:

The evaluation scale: 0 to 100 points (grade A to F).

6. The overall evaluation

90 (A)

Criteria description:

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.

Comments:

Petr's result and the corresponding software development are complete and accurate. More discussion of the results would have been desirable. In addition to his main task of recorded data analysis Petr managed in the time frame of his thesis to include the evaluation of the simulated signal data as well. His assignment was very well fulfilled.

Signature of the supervisor: