

I. IDENTIFICATION DATA

Title:	Alternative solution of transport problem in the TRM2D software
Author's name:	Evgeniy Kleschenko
Type of assignment:	Bachelor Project
Faculty:	Faculty of Nuclear Sciences and Physical Engineering (FNSPE)
Department:	Department of Mathematics
Supervisor:	Jan Šembera
Supervisor's affiliation:	Technical University of Liberec

II. ASSESSMENT OF CRITERIA

Work assignment and topic motivation	demanding
<i>Assess how demanding the assigned topic is. Brief introductory word on motivation for choosing the topic.</i>	
<p>TRM 2D is a software that was originally built for purpose of testing of the connection between a transport modelling SW and a geochemistry modelling SW in frames of the project no. TH02030840. The geochemistry modelling module is a standard SW from a third party with closed source but the transport module is an open source software. It was not clear from the project report which numerical method was used for the transport model. This was my motivation to formulate this bachelor project assignment. The assignment was finally more demanding than I originally supposed because of numerical mathematics, which is far beyond the normal computer science curriculum. The student had to do rather many changes to the source code of the software to change the numerical computation and also to allow the user to input new parameters of the computation.</p>	

Fulfilling the assignment	fulfilled
<i>Consider whether the work submitted meets the assignment topic. Comment, if necessary, on items of the assignment not fully answered, or mention whether the scope of the assignment has been broadened. If student failed to fully treat the assigned topic, try to assess the importance, impact and/or the reasons for failings.</i>	
<p>I feel that the student fulfilled the assignment. He studied both Finite Difference and Finite Volume methods, adopted the TRM2D software and recognized and described the method implemented in its transport module. He formulated and implemented an alternative method (which was, in agreement with the supervisor, an extension of FV model to include diffusion terms. Finally, he tested the newly implemented method.</p>	

Student's effort and independent approach to the topic solution	average
<i>Assess whether student displayed constant effort while investigating the problem, whether they regularly consulted the issues and whether they attended consultations well prepared. Assess student's creativity and independence.</i>	
<p>The student was very active during the whole time of the project solution. He communicated almost every week and worked systematically and brought his questions, ideas and solutions. The only problem appeared at the very last weeks of the bachelor thesis composition when he did not distribute his work wisely and rushed through testing and final edits to the text. This was reflected in the range of tests performed. If the last weeks looked as the previous term, I would grade the student's effort rather as excellent.</p>	

Professional standard	excellent
<i>Give your opinion on the professional standard of the work, application of course knowledge, references, and data from student's practice.</i>	
<p>I assess the professional standard of the work as excellent. The student had to study two numerical methods and several physical processes, propose two models, compare them with the existing software implementation, and do changes to the software to get an alternative model. Not only from my consultations with the student during his work but also from the formulations of the thesis I am convinced that he understood and applied the knowledge proper way on an excellent professional standard.</p>	

Level of formality and of the language used**excellent**

Assess the use of scientific formalism, the typography and language of the work.

As far I can judge it, I feel the language comprehensible and the level of formality adequate.

Choice of references, citation correctness**excellent**

Give your opinion on student's effort in utilizing references in their investigation. Characterize the choice of references and say whether all relevant sources were utilized. Verify whether all resource facts were properly distinguished from student's own findings and results, whether there was no breach of citation ethics, and whether all reference citations are complete and agree with the citation usage and standards.

The student refers six texts of other authors. I think that he distinguishes his results from cited ideas the proper way.

Further comments and assessment

Give your opinion on the quality of the main results obtained in the work, e.g. on the level of quality of theoretical results, or the applicability of the engineering and programming outputs of the solutions obtained, on publication activity, experimental skills, etc.

The result of the thesis meets completely my previous idea about it. The numerical mathematics was beyond the normal computer science curriculum but the student could understand and apply it. The student had to understand the structure and functionality of the original code and recognize the implemented numerical method. Finally he made changes to the code to implement a new process (diffusion) model and input and output procedures connected with this new part of the model. The only part of the thesis, I would prefer to be more thoroughly processed, is the testing. But even this part was done minimalistic way, it is finally sufficient.

III. OVERALL ASSESSMENT AND SUGGESTED GRADE

Summarize all aspects of the work most influential for the overall assessment. If adequate, write questions to be answered by student during the defence of their work before the board.

I would like to praise the student's activity. During the whole time of the project solution he worked systematically and brought his questions, ideas and solutions. Except of the last weeks when he did not distribute his work wisely and rushed through testing and final edits to the text. I also appreciate his ability to understand and use the knowledge of numerical mathematics that he had to study for the purpose of the bachelor project solution. Although I would have liked to see a more carefully crafted chapter on testing, I consider the minimalist form of testing implemented to be sufficient to meet the assignment so that there is no need to lower the student's grade.

Suggested grade: **A - excellent.**

Date: 23.8.2023

Signature:

