

PDE Project course 2018–19 (TMA632/MMA500)

Teacher: Stig Larsson

About the course: The topic of the course is to implement a PDE problem in FEniCS and to present and discuss the chosen algorithms theoretically. The suggested projects are:

- Numerical solution of stochastic PDE of the form

$$dX + AX dt = B dW, \quad t \in [0, T].$$

This could be the stochastic heat equation or the stochastic wave equation.
Lectures on SPDE.

- Splitting methods for evolution problems of the form

$$\dot{u} + (A + B)u = 0, \quad t \in [0, T].$$

Several variants are possible. **Article 1.** **Article 2.**

Students may also suggest their own projects.

The first time we meet the students will form groups of 2–3 people and each group will choose a project.

Lectures and tutorials: There will be lectures in the beginning of the course as required by the background knowledge of the students. Then we will meet once a week for tutorials to discuss the projects. Additional tutorials will be offered on request.

Assessment: Each group has to write a report on the implementation they have done. The report has to be written in LaTeX in a research paper format containing: title, abstract, introduction, description of the method, numerical experiments, conclusions, references. At the end of the course each group has to present a 15 minutes talk on their project with the time approximately equally distributed between the group members.

In order to pass the course each group has to book two consultations with me where they report on their progress. The first one preferably in week 3 and the second one towards the end of the study period. These are compulsory.

The final mark in the course will be based on the written report (70%) and the presentation (30%) with both of them compulsory. The specific criteria in evaluating the report:

- Format and organization (20%)
- Mathematical correctness (40%)
- Clarity of writing (40%)

The specific criteria in evaluating the presentation:

- Organization (40%)
- Clarity (40%)
- Mechanics (20%)

The mark for the report and the presentation will be the same for each group member.

Deadlines:

- The report has to be submitted in pdf format to me by 2019-01-20.
- The presentations will be scheduled in one session in the week January 14-18, 2019. All groups must be present.

Grading scale: In both the report and the presentation you have to achieve 41% or more to pass the course. The final grading scale is as follows:

- Chalmers: 0-40% (U), 41-60% (3), 61-84% (4), 85-100% (5)
- GU: 0-40% (U), 41-80% (G), 81-100% (VG)

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