Guidelines for the Numerical Optimal Control Project

(response to be sent by email to messerer@tf.uni-freiburg.de before June 21st, 10am)

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As explained at the beginning of the course, you have the possibility of doing a project to get an additional 3 ECTS. The project consists in the formulation and implementation of a self-chosen problem of Numerical Optimal Control, resulting in documented computer code, a project report, and a public presentation. In the following you will receive some information regarding the scope of the project and our expectations.

If you are interested in doing a project please *let us know via email before June 21st, 10am*. This is a necessary condition for being allowed to do the project. The email should contain the title of your project, the corresponding authors and a short description of your concept. It should comprise a description (in words) of your objective, constraints and decision variables. Note that you will not be required to stick to your description, but you should have spend some thoughts on it already. Also make sure that you are registered in HISinOne for both the project module and its exam (or whatever your examination office requires).

If you would like to form a group, but do not have a group mate yet, let us know before June 17th, 8am. We will then put you in contact with each other.

1. The project can be done in groups of one or two people.

2. The project consists in the formulation and implementation of a self-chosen problem of Numerical Optimal Control. The focus lies on the formulation of the problem and the solution methods.

3. The report should contain at least one sketch of the modeled system.

4. The main result is a written report (approx. 6 pages) submitted as a PDF file. We strongly recommend using LaTeX[1]. You can consider using the official IEEE template for conferences that can be downloaded here:

   `www.ieee.org/conferences_events/conferences/publishing/templates.html`

5. The report must be a new and self-written document and may not contain any copy of other text or figures. The report must be solely written by the author(s).

6. The report must include a short, interesting title, the name(s) of the author(s) and an abstract. The content should be clearly structured in sections. It should start with an introduction and conclude with a short summary and critical discussion of the results.

7. Figures and tables should have a short caption and be referenced in the text properly, e.g. "the results are shown in Fig. 1". Use the Latex commands `\caption`, `\label` and `\ref`.

8. Plots must contain physical units and axis descriptions.

9. The report must cite all external sources as references at the end and other people's contributions must be acknowledged. Using other people's ideas and help is allowed, even encouraged. But not citing or acknowledging them properly is fraud.

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[1]If you have not learned LaTeXyet, see this report as an opportunity. It will certainly pay off for your master's thesis.

10. Mathematical or physical variables shall consist of one letter only and be printed in italics. This is automatic in Latex, e.g., a_i as `$a_i$`. Physical units and sub- or superscripts that refer to words are in normal roman letters (use `mathrm` when in Latex mathmode, e.g. x_{initial} as `$x_{\mathrm{initial}}$` or $\frac{\mathrm{kg}}{\mathrm{m}^3}$ as `$\frac{\mathrm{kg}}{\mathrm{m}^3}$`. Write, e.g., $m = 5\,\mathrm{kg}$ (and not $m = 5kg$ or m= 5kg).

11. On July 26th, during the lecture, a short presentation of 10 to 15 minutes[2] shall be given by the author(s) to the teacher and the class. The slides can be based on material taken from the report and may contain additional content, e.g. videos, if required.

12. The project grade is based on the form and content of the report, the originality and quality of the results, the clarity of the code, the quality of the slides, the oral presentation and the answers to any questions.

13. **Deadline** for submission of the written report and the code is:

July 26th at 10am, sent by email to messerer@tf.uni-freiburg.de

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[2]The exact time will be announced when the number of projects is known