Flight Control Lab
Albert-Ludwigs-Universität Freiburg – Winter Term 2022/23
Guidelines for the Flight Control Lab Project Report
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1   Grading structure

The **project grade** is based on the form and content of the **report**, the **presentation**, the originality and quality of the **results**, and the clarity of the **code**. The weights of each component in the final grade will be as follows: 50% report, 30% presentation, 20% code

2   Guidelines

1. The main result is a written report (approx. 5 pages) submitted as a PDF file. We strongly recommend using LaTeX[1]. You can consider using the official IEEE template for conference papers that can be downloaded here:

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

2. The report must be a new and self-written document. The report must be solely written by the author(s). It may not contain any text generated a by large-scale language model (LLM) such as, e.g., GPT.

3. 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.

4. The report should contain at least one (selfmade) sketch of the modeled system or implemented algorithm.

5. 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`.

6. Plots must contain physical units and axis descriptions.

7. 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.

8. If you use academic open source software to obtain your results, it is also usually a request by the developers that you acknowledge their work by citing the corresponding papers, e.g, "The problem was formulated via the Matlab interface of the symbolic framework CasADi [1] and solved using the interior point method based solver IPOPT [2]."

9. 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., $m = 5$ kg (and not $m = 5kg$ or m= 5kg).

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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. The project report must be sufficient to reproduce all the results mentioned in your project. That means, if for example, your controller outputs the individual motors angular velocity and you could not send this directly to the CrazyFlie drone. Instead you have written a mapping from this to thrust, roll, pitch, yaw rate, which you are able to send to the CrazyFlie. Then this mapping has to also be included in the report.

11. The code should be well documented. The variable names should be meaningful and the results should be also reproducible on other machines. That means you should also list any external software needed to run your code.

12. On **February 13th**, a **short presentation** will be given by the author(s) to the teacher and the class. The slides can be based on material taken from the report and should contain a demo of the results, preferably in video format (contact Mohammad if you need help with the recording) . Even though there is some time left to finish the report, you should already present final results.

13. After your presentation, there will be a Q&A about your project (approach, limitations, ..). You should be able to answer the questions and it will count as part of the presentation grade. Keep in mind that if you are given suggestions for improvement this will in no way affect your grade negatively. You should take the feedback and incorporate it into your report.

14. After the presentation you have some time to update your results based on the feedback. The **deadline** for the submission of the **written report** (and the code) as **one single zip file** is:

March 05, 2023, at 23:59, sent by email to Andrea or Jackob

References

[1] J. A. E. Andersson, J. Gillis, G. Horn, J. B. Rawlings, and M. Diehl. CasADi – A software framework for nonlinear optimization and optimal control. *Mathematical Programming Computation*, 11(1):1–36, 2019.

[2] A. Wächter and L. T. Biegler. On the implementation of an interior-point filter line-search algorithm for large-scale nonlinear programming. *Mathematical Programming*, 106(1):25–57, 2006.