Model Predictive Control and Reinforcement Learning
– Project Instructions –

Joschka Boedecker and Moritz Diehl

University Freiburg

July 30, 2021

Projects

- Projects can be either application- or algorithm-oriented.
  - For application-based projects you formulate and solve a self chosen optimal control or reinforcement learning problem. The focus should be on the mathematical description of your problem (the modeling), its numerical solution and the interpretation of the results.
  - For algorithm-based projects, you choose a scheme for the solution of optimal control problems or a reinforcement learning algorithm. The focus is then on the implementation of the scheme and an investigation of its performance, using several test problems/benchmarks. They should illustrate the properties of the algorithm, but need not necessarily have a real-world interpretation.
- The project can be done in groups of up to three students.

Project Pitch Session

- During the project pitch session on Friday, July 31, you may propose a project idea and find potential team members. For the remote participants, we will meet here: `https://www.wonder.me/r?id=20f5f8da-411c-4c79-8560-05fbe4475ebf`
- Please send one (!) email per team including the names of all team members as well as a (preliminary) project title to `katrin.baumgaertner@imtek.uni-freiburg.de` before Monday, August 2, 9 a.m.

Project Presentations

- The project teams should present their project idea and maybe already some (intermediate) results on Wednesday, August 4.
- Please send your presentation which should be a pdf with maximum 3 slides (1 title slide, 1 problem formulation slide, 1 results slide) before 10 a.m. to `katrin.baumgaertner@imtek.uni-freiburg.de`
- You have four minutes to present your project idea.

Project Report

- 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).

- 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.

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

- 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.

- The report should be 4 to 5 pages.

- We strongly recommend using LaTeX. You can consider using the official IEEE template for conferences that can be downloaded here: `www.ieee.org/conferences_events/conferences/publishing/templates.html`

- Please send your report as pdf to `katrin.baumgaertner@imtek.uni-freiburg.de` before August 18.