

Robotic Manipulation

Exercise Practicalities

Tran Nguyen Le Daulet Baimukashev

Exercise session overview

- Exercise sessions every Wednesday 08:15-10:00 (remotely via Zoom) and Thursday 10:15-12:00 on-site at (room).
- Voluntary presence. However, it is strongly recommended to present at least on one session as we will introduce and go through the exercise in the sessions.
- Teacher assistants (TAs) present to help you.
 - ▶ Tran Nguyen Le ([tran.nguyenle\(at\)aalto.fi](mailto:tran.nguyenle@aalto.fi))
 - ▶ Daulet Baimukashev ([daulet.baimukashev\(at\)aalto.fi](mailto:daulet.baimukashev@aalto.fi))

Platform for exercises

We provide two options this year.

- **A virtual image (Ubuntu 18.04 + ROS Melodic)**, which can be directly open using for example Oracle VM VirtualBox. (We strongly suggest you to use this option. **If there exists problem**, you can then use the **alternative option below**.)
- **VDI provided by Aalto (Ubuntu 20.04 + ROS Noetic)**, which you can access both from your PC and Aalto computers.

Despite the difference in the version of Ubuntu and ROS, the code should run just fine on both.

Communication

- The preferred means of communication is the course slack channel (the link to join can be found on MyCourse) and not email.
- When you sign up to the slack workspace use your **aalto username** as the **Nick name** as we will link this to your gitlab repository.
- Usually more than one student have similar problems and thus we advocate asking questions in the exercise slack channels to enable students to help each other out.
- TAs and the lecturer will, per default, not answer emails or slack messages during the weekends.

Exercises

In total six problems:

- 1 Introduction to ROS.
- 2 Planning algorithms benchmark in MoveIt
- 3 Simple pick and place with MoveIt
- 4 Force control
- 5 Two-finger grasp planning
- 6 Dual-arm (hybrid control)

Tentative exercise schedule

The exercises are introduced on the following exercise sessions

- 11st and 12th of January intro to exercise 1
- 25th and 26th of January intro to exercise 2
- 8th and 9th of February intro to exercise 3
- 22nd and 23rd of February intro to exercise 4
- 8th and 9th of March intro to exercise 5.
- 22nd and 23rd of March intro to exercise 6

Exercise Deadlines are stated separately in each assignment PDF.

Submissions

- Each solution include at least source code written in C++ that solves the problem and for all exercises (except exercise 1) you also need to submit a report written in English.
- The report (saved as PDF) should answer the questions posed in the assignment which can, for example, be the following
 - 1 Which planner is fastest and why? Plot the running times and answer the questions by comparing the algorithms.
- If the exercise requires you to **submit both** a report and code you need to submit both. Otherwise, your solution will be **rejected** and you will be awarded with **0 points**.
- Each student forks the exercise into their own gitlab group, solves the exercise there, and finally upload everything to the respective repository before deadline

How to make a good report?

A good exercise submission report should meet the following criterias:

- The Latex template (Link) is used
- Sections in the latex report match the tasks/questions in the instructions. We will subtract one point per criteria that is not met, up to 5 points total for each exercise.
- How to answer questions? Questions are divided into:
 - ▶ - Yes/no questions, e.g. Is the contact force equal to the desired force?
 - ▶ - Discussing questions, requires you to briefly explain or justify your answer, e.g. why/why not?

Grading

- The code is graded based on correctness (0-100%).
- The report is graded based on:
 - ▶ Correctness (0-100%),
 - ▶ How well it is written (satisfactory, good, excellent).
 - ▶ We will grade both language and structure of the report. For example, the report should be easy to read and coherent, and you need to refer to all figures, tables etc. Think of every single report as a part of your future MSc. thesis.
- TAs will provide the grade and feedback for the given exercise on MyCourse.

Exercise rules

- Exercises are handed in and done **individually**
- You are allowed to discuss the problems but not share solutions.
- No copying of exercises (neither code nor report). If we notice plagiarism it is reported and consequences follow.
- No late submissions are accepted.