Robots practicals

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<table>
<thead>
<tr>
<th>Cursus</th>
<th>Sem.</th>
<th>Type</th>
<th>Language</th>
<th>Credits</th>
<th>Withdrawal</th>
<th>Session</th>
<th>Semester</th>
<th>Exam</th>
<th>Workload</th>
<th>Weeks</th>
<th>Hours</th>
<th>Practical work</th>
<th>Number of positions</th>
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<td>Robotics, Control and Intelligent Systems</td>
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<td>Robotics</td>
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Summary

The goal of this lab series is to practice the various theoretical frameworks acquired in the courses on a variety of robots, ranging from industrial robots to autonomous mobile robots, to robotic devices, all the way to interactive robots.

Content

The practicals can include the following topics:

• Teaching Robots to Accomplish a Manipulation Task
• Experimenting with haptic interfaces
• Controlling a serial robot ABB IRB 120
• Control of the Micro Delta Direct Drive robot
• LiniX, linear axis, assembly and control
• Franka robot, programming by teaching
• Programming and characterization of a modular fish robot
• Tangible Human-Swarm Interaction using ROS
• Artificial Muscles
• ROS basics
• Integrated barometer/GNSS height determination on a UAV
• EMG control of a robotic Hand
• Noise
• 2DOF Helicopter control

WARNING: These practicals have a limited number of places, due to the heavy equipment used, students following the master in robotics will have priority in the attribution of places.

Keywords

industrial robotics, haptics, autonomous robots, manipulation, navigation

Learning Prerequisites

Required courses
 Basics of mobile robotics
Introduction to automatic control
Introduction to signal processing

Important concepts to start the course
Robotics
Programming
Automatic control
Signal processing

Learning Outcomes
By the end of the course, the student must be able to:
• Assess / Evaluate the performances or a robotic system
• Synthesize a control system
• Discuss the performances of a system
• Elaborate the model of a system

Transversal skills
• Plan and carry out activities in a way which makes optimal use of available time and other resources.
• Use a work methodology appropriate to the task.
• Collect data.
• Write a scientific or technical report.

Teaching methods
Students attend a set of practicals by groups of two or three, supervised by an assistent.

Expected student activities
Preparation of the practicals before attending it, writing of the report after the practical.

Assessment methods
Written report and oral feedback during the practical

Supervision
Office hours      No
Assistants        Yes
Forum             No

Resources
Moodle Link
• https://go.epfl.ch/MICRO-453