

Hände und Greifen / Robot Grasping and Computational Kinematics 2019 Winter

Organizer	Prof. Dr. Jochen Steil
Lecturer	Dr. Bertold Bongardt
Exercises	S. Barut / B. Bongardt / H. Donat / S. Tittel

Format	2 SWS (L) + 2 SWS (E)
Times / Rooms	Mon, 15:00 – 16:30 (L) + Wed, 11:30 – 13:00 (E)
Rooms	PK4.1 (L) + PK3.4 (E)

Module / Credit points	INF-ROB-38 / 5
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Goals

Based on the courses ‘Robotics 1: Technical and Mathematical Foundations’ and ‘Robotics 2: Modeling, Analysis, and Control’ in the previous semesters, we continue the study of analytical mechanics in this ‘Robotics 3’ course. We consider the mathematical problems associated to the crucial task of *robot grasping* and study selected topics of the field of *computational kinematics*. The course is a specialized masters teaching module offered by the IRP. It introduces ‘advanced tools’ that help to solve real-world mechanical problems.

Audience

Students of Computer Science and STEM (Science, Technology, Engineering and Mathematics)

Literature

Relevant reading material will be announced in the lecture

Overview

Block	Monday	Topic
01	10-21	Hands, Grippers, Manipulation
02	10-28	Line Geometry and Screw Theory
03	11-04	Displacements and Adjoint Representations
04	11-11	Dual Quaternions and Projective Coordinates
05	11-18	Modeling of Mechanical Closed Loop Systems
06	11-25	Satisfaction and Optimization
07	12-02	Modeling of Contact and Grasps
08	12-09	The Grasping Problems
09	12-16	Evaluation of Grasps

10	01-06	Search for Optimal Grasps
11	01-13	tba (Kinematics 1)
12	01-20	tba (Kinematics 2)
13	01-27	tba (Kinematics 3)
14	02-03	Conclusions
