ELE306 Robotikk Semester Logg

mandag 24. november 2025 07:07

Henrik = H
Knut Wilhelm = KW
Christopher = CH

ELE306 Robotics semester project - cheat sheet

This is a summary of the requirements for the semester project with expectations to report content.

Project requirements checklist

No.	Robot	Requirement	In report	Check
1	**Develop forwards kinematics of your robot, in Matlab (not toolbox!), or by hand**			
1.i.1.	Arm	**Develop** table of DH parameters	DH table with explanation	KW/H
1.i.2	Arm	**Develop** the transformation mapping *End-effector* to *base* (first 4 joints only)	Explain your thinking, and show steps with equations	Henrik
1.ii.1	Mobile	**Draw** a model of the mobile robot with necessary variables defined	Include drawing with all relevant variables included	Henrik
1.ii.2	Mobile	**Develop** the kinematic equations of motion	Show how you get equations, include intermediate steps	Henrik
1.ii.3	Mobile	**Discuss** if holonomic or non-holonom.	Short text with disc. and concl.	KW/CH
1.iii.1	General	Develop transformation from chosen *sensor system* to *relevant coord.* system on robot (world, base, etc.)	Explain your thinking, and show steps with equations	KW/CH
2	**Model your robot kinematics with Peter Corke's toolbox in Matlab**			
2.i.1	Arm	**Demonstrate** equivalence of prev. forward kinematic solution from 1.i.2. using the toolbox	Include screenshots from Matlab, and/or your hand-written equations	KW/CH
2.i.2	Arm	**Develop** the differential kinematics, and **demonstrate** how it can be used	Use toolbox, and include screenshot (or link to video) in report	KW/CH
2.i.3	Arm	**Develop** inverse kinematics, and **demonstrate** how it can be used	Use toolbox, and include screenshot (and link) in report	KW/CH
2.i.4	Arm	**Demonstrate** example motion planning on relevant task	Use toolbox, and include screenshot or link to video	CH
2.ii.1	Mobile	**Determine** suitable controller for chosen challenge	Explain why you have chosen this controller for the task	CH
2.ii.2	Mobile	**Implement** the kinematic model and controller in Matlab	Include screenshot of Simulink model (or m-file)	CH
2.iii.1	General	**Demonstrate** using sensor system to command robot	Show calculations necessary to get joint angles to move robot tool to object in sensor frame	KW/CH
3	**Simulate the kinematics of your robot in Matlab**			
3.i.1	Arm	***Either:*** **Move** end-effector using motion planning through relevant poses	Include screenshot **and** link to video of robot arm moving	KW
3.i.2	Arm	***Or:*** **Move end-effector** using velocity commands with diff. kinematics to solve task	Include screenshot **and** link to video of robot arm moving	
3.ii.1	Mobile	**Simulate** your control strategy, and **discuss** performance	Include screenshot of simulation w/ short discussion	KW
3.ii.2	Mobile	**Discuss** and **implement** navigation strategy	Explain why this nav. strategy, and include screenshot **and** link to video of navigation	KW
3.ii.3	Mobile	**Discuss** a localization strategy for the mobile robot	Discuss appropriate sensors, and how to estimate pose	CH/KW

4	**Simulate robot in Gazebo using Matlab and ROS**			
4.i	General	**Model** the complete (arm+mobile) in URDF, and **visualize** robot in Gazebo: 1. Robot arm mounted on mobile base 2. Mobile base with wheels, sensors	Include screenshots of robot from Gazebo	H
4.ii	Arm	**Demonstrate** controlling arm in Gazebo using ROS for a trajectory, <u>*or*</u> diff.kinematics, from Matlab	Include screenshot **and** link to video of robot arm moving	H
4.iii	Mobile	**Demonstrate** controlling mobile robot in Gazebo using Matlab and ROS	Include screenshot **and** link to video of mobile robot moving	H
5	<u>***Optional:***</u> **Control a physical <u>UR, Turtlebot, or other robot</u>**			
	General	**Control** a physical robot using Matlab and ROS	Include pictures **and** link to video of robot moving	

<u>**Remember:**</u>

To get a top grade, you must **explain** all choices that you make, **document** all simulations results using **screenshots**, and **link to videos** showing arm and mobile robot moving when asked for!

The report should **not** be more than 3000 words (±10%) – put extensive details in appendices.

A **log** must be included in an Appendix detailing what each group member worked on during the project in terms of theory, code, presentations, and report.

Follow the suggested structure for the report:

1. Introduction
2. Design process
3. Implementation
4. Experiments (w/discussion)
5. Conclusion
6. References
7. Appendices
    a. PDR, CDR and final presentation slides
    b. Log of what each group member worked on during the project (**Signed!**)

Presentasjoner ble laget sammen av alle gruppemedlemmene, og presentert av alle i gruppen.

Alle medlemmene har laget sin egen kode for de oppgavene de har gjort.

Hvert medlem har skrevet sine resultater inn i rapporten, og disse resultatene ble senere skrevet om til en mer lesbar tekst.

Underskrifter

Knut Wilhelm O. Saatvedt

Christopher Veland

Knut Wilhelm Omholt Saatvedt	Henrik Leivestad	Christopher Wallem Veland

Henrik Leivestad

4	**Simulate robot in Gazebo using Matlab and ROS**			
4.i	General	**Model** the complete (arm+mobile) in URDF, and **visualize** robot in Gazebo: 1. Robot arm mounted on mobile base 2. Mobile base with wheels, sensors	Include screenshots of robot from Gazebo	
4.ii	Arm	**Demonstrate** controlling arm in Gazebo using ROS for a trajectory, *or* diff.kinematics, from Matlab	Include screenshot **and** link to video of robot arm moving	
4.iii	Mobile	**Demonstrate** controlling mobile robot in Gazebo using Matlab and ROS	Include screenshot **and** link to video of mobile robot moving	
5	***Optional:* Control a physical UR, Turtlebot, or other robot**			
	General	**Control** a physical robot using Matlab and ROS	Include pictures **and** link to video of robot moving	

Remember:

To get a top grade, you must **explain** all choices that you make, **document** all simulations results using **screenshots**, and **link to videos** showing arm and mobile robot moving when asked for!

The report should **not** be more than 3000 words (±10%) – put extensive details in appendices.

A **log** must be included in an Appendix detailing what each group member worked on during the project in terms of theory, code, presentations, and report.

Follow the suggested structure for the report:

1. Introduction
2. Design process
3. Implementation
4. Experiments (w/discussion)
5. Conclusion
6. References
7. Appendices
    a. PDR, CDR and final presentation slides
    b. Log of what each group member worked on during the project (**Signed!**)