

Example of PhD Thesis with RoboticsLaTeX template



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In partial fulfillment of the requirements for the degree of

Laurea Magistrale in Robotics Engineering

December 17, 2025

Declaration of Originality

I, Simone Lombardi, hereby declare that this thesis is my own work and all sources of information and ideas have been acknowledged appropriately. This work has not been submitted for any other degree or academic qualification. I understand that any act of plagiarism, reproduction, or use of the whole or any part of this thesis without proper acknowledgment may result in severe academic penalties.

Acknowledgements

I want to thanks all the people that helped me during my time at University of Genova, starting with professor Cannata. His assistance was essential in the development of this thesis. I than extend my deepest gratitude to Francesco Grella and Francesco Giovinazzo, them with all the other people of the MACLAB laboratory made me feel welcomed and have given me invaluable advice throughout my journey with them.

On a personal note, I want to thanks all my colleagues of the Robotics Engineering course. The friendship I found are extremely meaningful to shape me in the person I am today. Last but not least, in the slightest I want to tell my family and friends that their unwavering support and belief in me did not go unnoticed, I would not be here today if it wasn't for them.

This is a short, optional, dedication. To all the Master and PhD
students of Robotics Engineering at the University of Genova.

Abstract

Since the 1960s, the use of robotic systems in industrial applications has continuously increased. However, even with this incredible force driving innovation, some tasks have proven to be too complex or not cost-effective to be performed by a robot. With the advent of Industry 4.0, the proposed solution to these problems was **Human-Robot Collaboration** — building work-cells capable of integrating a human agent performing a set of tasks that can be coordinated with a robotic agent to achieve a common objective. This approach opened up a completely new set of challenges, the first of which are safety and perception. The robotic agent needs a way to perceive the human in the workcell and must be able to react to unpredictable movements to avoid collisions. During my thesis, I worked within the **SESTOSENSO project**, specifically in Use Case 1. Their robotic system, composed of two 6-DoF industrial articulated robots mounted in series, is equipped with a set of proximity and tactile sensors. My work focused on creating a unified architecture for the two robots, exploring the capabilities of a 12-DoF robot, and proposing possible directions to improve the system's functionalities. Moreover, this work also aimed to identify potential problems and weaknesses. I achieved these objectives through a series of simulated experiments, using a task-priority approach for system control, as I was interested in exploiting the high redundancy of the robot to perform multiple tasks simultaneously. I then analyzed the result to evaluate the effect of each task on the behavior of the robot.

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Conclusions

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Extra

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References

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