

PERSONAL INFORMATION **Lorenzo Govoni**

## EDUCATION AND TRAINING

- Sept. 2024–Feb. 2025 **Norwegian University of Science and Technology - NTNU, Trondheim, Norway**
- Visiting PhD student at the Department of Engineering Cybernetics
  - Research projects: task allocation in autonomous multi-vessels systems and task allocation in satellite application for hyperspectral imaging.
  - Supervisor: Prof. Tor Arne Johansen
- 2023 Professional Engineering certificate
- 2022-Current **Sapienza university of Rome, Rome, Italy**
- PhD in Automatic Control, Bioengineering and Operations Research (ABRO)
  - Curriculum in Automatic Control
  - Supervisor: prof. Andrea Cristofaro
- 2020-2022 **Sapienza university of Rome, Rome, Italy**
- MSc in Control Engineering, *110/110 cum laude*
  - Thesis: "Observer based residuals for fault and collision isolation in robot manipulators"
- 2017-2020 **Sapienza university of Rome, Rome, Italy**
- BSc in Computer and System Engineering, *110/110 cum laude*
  - Thesis: "Synthesis of optimal trajectories in non-holonomic robots with limited field of view"
- 2012-2017 **Liceo Scientifico Statale Stanislao Cannizzaro, Rome, Italy**
- High school degree, *100/100 cum laude*

## RELEVANT PROJECTS

**Observer based residuals for fault and collision isolation in robot manipulators** *Master Thesis**Thesis*

Implementation on a real Kuka LWR 4+, present at the Robotics Lab in Università di Roma "La Sapienza", of a collision detection framework through approximated momentum-based residual based on a reduced-order velocity observer. Results have been compared also with the case of the use of a full-state observer, and has been stated that the estimation given by the reduced-order observer leads to a residual signal less noisy, which is preferable in the context of collision detection for achieving fast responses in case of collisions. (MATLAB/C++)

**Consensus problem in multi-agent hybrid systems** *Control of Multi Robot Systems project*

Analysis of the behavior of multi-agent systems over networks subject to time-driven jumps. Characterization of the hybrid multi-consensus behaviour when dealing with agents that communicate through distinct communication graphs at jump and flow times. The work has been applied first to simple integrator agents and then extended to the nonlinear case where each robot is modelled as a unicycle. (MATLAB)

**Analyzing the Performances of a Compliant 3R Planar Robot using the ESP Control** *Underactuated Robot project*

Analysis of the ESP control approach as a way of assigning a damping to the link variables of robots with compliant transmissions, in order to overcome oscillatory behaviours when a fast/hard impact occurs on the robot while it is performing regulation/tracking tasks. (MATLAB)

**Enforcing mobile robot safety under input constraints** *Autonomous and Mobile Robotics project*

Analysis of the Control Barrier Functions as a way to enforce some safety constraint by ensuring that the inputs will not make the system leave the safe set and will be inside the input constraints. The goal is to generate Input Constrained Control Barrier Functions for solving the Adaptive Cruise Control problem and simulate different scenarios. (MATLAB)

### Redundancy in robots with elastic joints: (local) minimization of elastic torques

*Robotics2 project*

Analysis of the local minimization of the weighted elastic torque in a redundant 3R planar robot with elastic joints while following a desired trajectory by comparing different weighting matrices and trajectories. (Simulink/MATLAB)

### Optimal Tuning of LQR controller for Quadrotor Helicopters using GA and PSO

*Optimal Control project*

Design of an LQR controller for a quadrotor helicopter with the use of two metaheuristic, Genetic Algorithm (GA) and Particle Swarm Optimization (PSO), for the optimal tuning of the matrices Q and R. (MATLAB)

### Synthesis of optimal trajectories in non-holonomic robots with limited field of view

*Bachelor Thesis*

Analysis of the minimization of distance executed by a non-holonomic robot, i.e. endowed with geometric constraints on the instantaneous motion available, which is equipped with a camera. The robot has to move in the space taking into account either the minimization of space and the physical constraints, while maintaining a fixed point in the space in the limited field of view of the camera. (MATLAB)

## WORK EXPERIENCE

- Nov 2024 Winner of a working scholarship position at the *I3S* Department of Engineering, Sapienza, as tutor/teaching assistant in the second semester of A.A. 2024/2025
- July 2023 Winner of a working scholarship position at the *I3S* Department of Engineering, Sapienza, as tutor/teaching assistant in the first semester of A.A. 2023/2024
- Feb 2023 Winner of a working scholarship position at the *I3S* Department of Engineering, Sapienza, as tutor/teaching assistant in the second semester of A.A. 2022/2023

## SCHOLARSHIPS

- Sept 2023 *Fondazione Roma Sapienza* scholarship for graduated master students in the Civil Engineering Department and in the *I3S* Engineering Department of Sapienza

## REVIEWER EXPERIENCE

- 2024 23rd European Control Conference, ECC2025
- 2024-Present IEEE Transactions on Control Systems Technology (IEEE TCST)
- 2024-Present IEEE Transactions on Automatic Control (IEEE-TAC)
- 2024 63rd IEEE Conference on Decision and Control, CDC2024
- 2024 10th International Conference on Control, Decision and Information Technologies, CoDIT2024
- 2023 9th International Conference on Control, Decision and Information Technologies, CoDIT2023

## PUBLICATIONS

- June 2024 **L. Govoni** and A. Cristofaro, "Decentralized task allocation for redundant multi-robot systems: an iterative consensus approach," presented at 18th IEEE International Conference on Control and Automation (ICCA), Reykjavik, Iceland, 2024.
- March 2024 A. Cristofaro, F. D'Orazio, **L. Govoni**, M. Mattioni (2024). "Multi-consensus Problems in Hybrid Multi-agent Systems". In R. Postoyan, P. Frasca, E. Panteley and L. Zaccarian (Ed.) Hybrid and Networked Dynamical Systems: Modeling, Analysis and Control (pp. 93-114). Springer Nature.

- October 2023 **Govoni, L.,** Cristofaro, A. (2023) Control Allocation for Windup Mitigation in Weakly Redundant Systems With Input Saturation, in IEEE Control Systems Letters, vol. 7, pp. 3295-3300, 2023, doi: 10.1109/LCSYS.2023.3324565.
- July 2023 **Govoni, L.,** Cristofaro, A. (2023) A fault-tolerant task allocation framework for overactuated multi-robot systems, in 2023 IEEE 9th International Conference on Control, Decision and Information Technologies (CoDIT), Rome, Italy, 2023, pp. 287-292, doi: 10.1109/CoDIT58514.2023.10284147.

CONFERENCES AND WORKSHOPS

- 18-21 June 2024 ICCA 2024, Reykjavik, Iceland - Speaker of the talk "*Decentralized task allocation for redundant multi-robot systems: an iterative consensus approach*" in the session "*Cooperative Control Systems*".
- 03-06 July 2023 CoDIT 2023, Rome, Italy - Speaker of the talk "*A Fault-Tolerant Task Allocation Framework for Overactuated Multi-Robot Systems*" in the session "*Multi-objective optimization*".

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	C1	C1	B2

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user  
[Common European Framework of Reference for Languages](https://www.europecouncil.europa.eu/en/european-framework-reference-languages)

- Computer skills
- competent in C/C++, MATLAB, Simulink,  $\LaTeX$
  - experience with Python, Java
  - operating systems: Ubuntu and Windows