Renato Loureiro

Convex Optimization · Nonlinear Systems · Control

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EDUCATION

Instituto Superior Tecnico *Lisbon, PT*

M.Sc. in Aerospace Engineering (Minor in Avionics) Sep 2020 – Dec 2022

- Degree with more emphasis into system control, system engineering, computer vision algorithms, optimization, telecommunications and electronics.
- GRADE: 18 / 20

B.SC. IN AEROSPACE ENGINEERING Sep 2017 – Sep 2020

- GRADE: 18 / 20

University of Stuttgart *Stuttgart, DE*

STUDYING ABROAD (ERASMUS) Sep 2021 – Sep 2022

EXPERIENCE

Institute of Flight Mechanics and Controls, Uni. Stuttgart *Stuttgart, DE*

RESEARCH ASSOCIATE *Feb 2023 – Now*

- FCAS Project: Guidance law development for missile swarm coordination
- Involved in developing CaΣoS, a MATLAB toolbox for solving Sum of Squares problems
- Supervised master's thesis projects and assisted with teaching and academic support activities

STUDENT ASSISTANT *Apr 2022 – Sep 2022*

- Co-developed a MATLAB toolbox for bilinear Sum of Squares optimization (BiSOS) and studied iterative methods for estimating regions of attraction in nonlinear systems

Student Projects *Lisbon, PT*

- UAV-ART (AeroTéc, 2021 – 2022): Developed computer vision algorithms for UAVs, including feature selection, object detection, point cloud generation, and SLAM.
- Formula Student (FST Lisboa, 2019 – 2020): Engaged in multidisciplinary project work across management, manufacturing, design, and CAD.

Volunteering *Lisbon, PT*

- IPHO (Aug 2018): Work as a volunteer at the International Physics Olympiad, being responsible for the Ecuador's team during the competition.

SKILLS

Programming: Matlab, Python, LaTeX, C/C++
Tools: Simulink, Git, Linux

TEACHING

University of Stuttgart *Stuttgart, DE*

TEACHING ASSITANT *2023 – Now*

- Analysis and Control of Nonlinear Flight Systems (WS 23)
- System Theorectical Methods for Flight Control (WS 23, SS 25)
- Estimation Methods (WS 24, SS 24/25)

PUBLICATIONS

Conference Proceedings (published)

1. R. Loureiro, M. Schneider, T. Cunis, W. Fichter, "Real-Time Cooperative Target Allocation for Guided Missiles: Leveraging Optimal Control and Multiple Trajectories," *AIAA SCITECH Forum*, 2025
2. M. Schneider, R. Loureiro, T. Cunis, W. Fichter, "Trajectory Prediction for Missile Targets: A Probabilistic Approach Using Machine Learning", *CEAS EuroGNC*, 2024

Conference Proceedings (accepted but not yet published)

1. R. Loureiro, T. Cunis, "Estimating Robust Regions of Attraction with Uncertain Equilibrium Points", *American Control Conference*, 2025
2. R. Loureiro, T. Cunis, "Nonlinear Observer Synthesis for Stochastic Polynomial Dynamical Systems", *American Control Conference*, 2025

Thesis

1. R. Loureiro, "Analysis and Comparison of Iterative Bilinear Sum-of-Squares Region of Attraction Estimation Algorithms", *Master Thesis*, University of Lisbon (IST), 2022