



Monica Rotulo

PhD Researcher in Data driven Control

Born: 1992, in Pavia, Italy
Address: Engineering and Technology institute
University of Groningen, The Netherlands

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Research Interest

Data-driven control; Supervised Learning; Machine Learning.

Experience

Graduate Research Assistant

Feb 2018–current

Engineering and Technology institute, University of Groningen, The Netherlands

Project on Data-driven control of complex systems;

The research is conducted in the Data Science and Systems Complexity (DSSC) Doctoral programme, co-funded through a Marie Skłodowska-Curie COFUND grant, no. 754315.

Teaching Assistant

Feb 2018–current

Engineering and Technology institute, University of Groningen, The Netherlands

Assistance with the courses "Control Engineering" and "Analysis and Control of Smart Systems".

Research Assistant

Mar 2016–July 2017

Institute of Automation and Control, TU Graz, Austria

Project on Dependable Networked control for Cyber-Physical systems (CPS);

The main goal was analyzing problems caused by the presence of network effects in the communication link to gain a better understanding of the connections between network and control theory.

Internship trainee

Mar 2015–Aug 2015

Robotics Lab - Control Systems Technology Group, TU Eindhoven, The Netherlands

Study on Event-Triggered Cooperative Control in context of Cooperative Adaptive Cruise Control.

Education

PhD Candidate

Feb 2018–Feb 2022

Systems and Control, University of Groningen, The Netherlands

Thesis on "Data-driven control of complex systems";

Motivated by the large amount of data now available in engineering, we seek to develop control algorithms solely based on learning from direct interaction with the environment, e.g. by online measurements and data collected directly from the plant, without assuming any knowledge of the system dynamics, shifting to a data-driven perspective.

Laurea Magistrale (M.Sc. equivalent)

Dec 2015

Computer Engineering - Major in Industrial Automation, University of Pavia, Italy (Grade: 110/110)

Thesis: *Analysis and design of an Event-Triggered Controller for Cooperative driving;*

Cooperative adaptive Cruise Control is a promising intelligence transport systems application which allows to decrease the space between cars. It employs wireless communication to overcome sensory limitations of radar systems such that the effect of disturbances throughout the vehicle string can be attenuated. The goal is to reduce the network utilization, while still guaranteeing good performance. The Event-Triggered Control has proven to be an adequate method that actually reduces the usage of communication resources, while retaining desired performance. After the design of an event triggering mechanism, the proposed solution was demonstrated by means of the Tech United soccer robots.

Laurea (B.Sc. equivalent)

Sept 2013

Computer Engineering, University of Pavia, Italy (Grade: 107/110)

Thesis: *Embedded Tracking Control of an inverted Pendulum*;

The problem of controlling an inverted pendulum is a test widely used to verify the validity of many control algorithms proposed in literature. A Model Predictive Controller (MPC) has been implemented on a Raspberry Pi which communicated with the pendulum via UDP protocol. Finally, the problem was extended in order to track a reference signal.

Featured Publications

M.Rotulo, C. De Persis, P. Tesi. "Online data-driven stabilization of switched linear systems." Presented at *2021 European Control Conference*, July 2021.

M.Rotulo, C. De Persis, P. Tesi. "Online learning of data-driven controllers for unknown switched linear systems.", arXiv:2105.11523, May 2021.

M. Rotulo, C. De Persis, P. Tesi. "Data-driven linear quadratic regulation via semidefinite programming." In *IFAC-PapersOnLine* 53.2: 3995-4000., 2020.

Relevant Workshops and Schools

CS229: Machine Learning
Stanford Online, free audit

Jan 2021-May 2021

EECI International Graduate School on Control: The Scenario Approach
Yildiz TU Istanbul, Turkey

Feb 2019

Dutch Institute of Systems and Control (DISC) National Graduate School:
Utrecht, The Netherlands

Mar 2018-Apr 2019

Computational Linear Algebra and Subspace Identification;
Adaptive Control;
Linear Matrix Inequalities in Control;
Machine Learning for Control (Summer school).

Skills

Programming: Python, C, Java. Simulations: MATLAB, Simulink. Software: \LaTeX , GIT Version Control System.