Gustav Nilsson
Post Doctoral Fellow

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Date of birth: June 9th, 1989
Nationality: Swedish

Education

Ph.D. in Automatic Control, Lund University, Sept 2013 – Feb 2019.

Supervisor: Giacomo Como.

Co-supervisor: Anders Rantzer.

M.Sc. in Engineering Physics, Lund University, Sept 2008 – Aug 2013.

Specialized in Mathematics and Automatic Control.

GPA: 4.8/5.

Research Interests

Modeling, control, and robustness analysis of dynamical flow networks with applications in transportation networks

Internships

October 2017 - March 2018: Mitsubishi Electric Research Laboratories, Cambridge, MA. Host: Uros Kalabic

Publications

Peer-Reviewed Conference Publications

1. R. Stalberg., G. Nilsson, and G. Como. "On Robustness of Equilibria in Dynamical Transportation Networks". Accepted to ECC 2019.

2. G. Nilsson, P. Grover, and U. Kalabic. "Assignment and Control of Two-Tiered Vehicle Traffic". 57th IEEE Conference on Decision and Control (Miami Beach, Florida), December 17-19, 2018.

3. C. Rosdahl, G. Nilsson, and G. Como. "On distributed optimal control of traffic flows in transportation networks" (INVITED). 2018 IEEE Conference on Control Technology and Applications (CCTA), Copenhagen, Denmark.

4. G. Nilsson and G. Como, "Evaluation of Decentralized Feedback Traffic Light Control with Dynamic Cycle Length". 15th IFAC Symposium on Control in Transportation Systems, 2018, Savona, Italy.

5. G. Nilsson and G. Como, "On Generalized Proportional Allocation Policies for Traffic Signal Control". (INVITED) 20th IFAC World Congress, 2017, Toulouse, France.

6. G. Nilsson, P. Hosseini, G. Como, and K. Savla, "Entropy-like Lyapunov Functions for the Stability Analysis of Adaptive Traffic Signal Controls," (INVITED) in Proc. of IEEE Control Decision Conference, (Osaka, Japan), December 15-18, 2015.

7. G. Nilsson, G. Como, and E. Lovisari, "On Resilience of Multicommodity Dynamical Flow Networks", in Proc. of 2014 Control Decision Conference, (Los Angeles, CA, USA), December 15-17, 2014.

In Preparation/Under Review

8. G. Nilsson and G. Como. "A Micro-Simulation Study of the Generalized Proportional Allocation Traffic Signal Control". Under revision.

Thesis

1. PhD thesis: "On robust distributed control of transportation networks", 2019.
   Supervisors: Giacomo Como and Anders Rantzer.

2. Master's thesis: "A multi-commodity dynamical model for traffic networks", 2013.
   Supervisors: Giacomo Como and Enrico Lovisari.

Research Visits

October – November 2018: Dipartimento di Scienze Matematiche "Giuseppe Luigi Lagrange", Politecnico di Torino

July 2018: Dipartimento di Scienze Matematiche "Giuseppe Luigi Lagrange", Politecnico di Torino

October and December 2016: Dipartimento di Scienze Matematiche "Giuseppe Luigi Lagrange", Politecnico di Torino

September – October 2015: Institute for Pure & Applied Mathematics, UCLA

May 2014: Grenoble Traffic Lab, INRIA Grenoble – Rhone-Alpes.

Reviews

Reviewer for IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Transactions on Intelligent Transportation Systems, Automatica, IEEE Control Systems Letters (L-CSS), IEEE Conference on Decision and Control (2015, 2016, 2017, 2018, 2019), American Control Conference (2017), IFAC World Congress (2017), IFAC Symposium on Control in Transportation Systems (2018), European Control Conference (2019).

Invited Seminars

DISMA Politecnico di Torino (Turin, Italy), July 4, 2018.

Teaching Experience

During my Ph.D. studies:

Network Dynamics – Teaching assistant three times and involved in the development of the course. Lecturing part of course spring 2019.

Physiological Models and Computations – Teaching assistant and involved in the development of the course.

Automatic Control, Basic Course – Teaching assistant four times.

Automatic Control, Basic Course in China – Lecturer for one third of the course and teaching assistant.

During my M.Sc. studies:

Calculus in One Variable – Teaching assistant one time.

Calculus in Several Variables – Teaching assistant two times.

Linear Algebra – Teaching assistant three times.

Supervision

Master's Thesis

1. Christian Rosdahl, "Distributed Control of Dynamic Flows in Traffic Networks", 2017, co-supervisor.

2. Joakim Guth, "On Distributed Maximization of Influence in Social Networks", 2017, co-supervisor.

3. Rasmus Stålberg, "On Robustness of Equilibria in Transportation Networks", 2018, co-supervisor.

4. Simon Paulsson, "Tuning Feedback-Based Traffic Signal Controls", 2018, co-supervisor.

5. Amani Jaafer, "Classification of Drivers' Behavior from IMU Data" (tentaive), 2019, co-supervisor.

Pedagogical Training

Over five weeks of pedagogical courses including:

Introduction to teaching and learning in higher education.

Communicating science.

Media Coverage

10 April 2019 "Forskare: Så kan världens bilköer kortas" *Researcher: So can the traffic queues in the world be shorted* Article from the Swedish News Agency TT, that appeared in several national and regional newspapers.

10 April 2019 "Nytt sätt att styra trafikljus kan korta bilköer" *New method for controlling traffic signals can shorten traffic queues* Swedish Radio, interviewed in their national news broadcast (Ekot)

11 April 2019 "Ny teknik kan minska bilköerna: 'Man får vänta kortare vid varje trafikljus'" *New technology can shorten traffic queues: 'One has to wait shorter at each traffic signal'* TV4 Nyhetsmorgon, national televised morning show.

Miscellaneous

Languages: **Swedish** native; **English** fluent; **German** basic; **Italian** beginner.

Programming Languages: MATLAB, C, Python, Java, PHP, SQL, LaTeX.