



Smart Systems in Control and Automation

Information for IEM Master students

DTPA, Discrete Technology and Production Automation

Three scientific staff members:



Prof. dr. Ming Cao

Analysis, control and optimization of complex network systems, such as, sensor network, social network, biological network, network of robots, evolutionary games, social decision making....



Prof. dr. Bayu
Jayawardhana

Advanced mechatronics systems, smart factory, industrial internet-of-thing, space and robotic applications, nonlinear control analysis and design, ocean grazer.....



Prof. dr. ir. Jacquélien
Scherpen

Physics based control design, such as smart energy systems, robotic systems, pricing and cost optimization in smart grid applications (optimal control, electricity grid, gas grid, power to gas), complexity reduction methods with applications.....

~27 PhD students, ~4 post-doctoral researchers, 2 technical support staff in the DTPA/SMS lab, 2 secretaries: Frederika Fokkens, f.g.fokkens@rug.nl, Phone: 38493

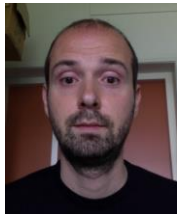
SMS, Smart Manufacturing Systems

Three scientific staff members:



Prof. Claudio De Persis

Cyber-physical Systems, Nonlinear Control, Dynamical Network Systems, Dynamic Games, Power Networks, Smart Grids, Heat Networks, Dynamic Pricing



Dr. Pietro Tesi

Supervisory Control, Hybrid Systems, Digital Control Systems, Adaptive Optics, Cybersecurity.



Dr. Nima Monshizadeh

(started 1 January 2018)

Complex Networks, Model Reduction, Power Networks and Smart Grids, Game Theory, Competitive Games, Network Optimization, Graph Theory

~13 PhD students, 1 postdoc, 2 technical support staff in the DTPA/SMS lab, 1 secretary: Frederika Fokkens, f.g.fokkens@rug.nl, Phone: 38493

Ongoing and potential future topics at DTPA

- › Pricing mechanisms in the smart grid (gas, power)
- › Embedding optimal control in smart energy systems
- › Embedding electric cars and smart charging poles in the power grid
- › Complexity reduction of networks (of power systems or mobile robots)
- › Smart robots for flexible manufacturing systems
- › Formation control for industrial robots
- › Modeling, design and control for smart factory
- › Safety and Privacy-aware control systems & Cloud control systems
- › Mechatronics design for advanced instrumentation (and Ocean Grazer)
- › Control design for a crystal growth process in an oven
- › Evolutionary stability of hypergraphs games on finite networks
- › On the equivalence of congestion and public goods games on finite networks
- › On the potential of voluntary public goods games on finite networks
- › Decision making in risky situations
- › Vehicle routing problems

- › *MANY MORE OPTIONS*

Discuss the options. Performing thesis work (partly) abroad is part of the possibilities.

Ongoing and potential future topics at SMS

- › Jamming-resilient self-triggered control: theory and experiments
- › Identification of network topology
- › Accelerated optimization and control algorithms
- › Power network control under Nash-Cournot competition
- › Network control via aggregative and competitive games
- › Supply function bidding games
- › Broadcasting consensus protocols under Denial-of-Service attacks
- › Modeling and control of Data Centers
- › Data-driven control of complex systems
- › Resilient control of networks with misbehaving agents
- › Control of complex networks: how much energy is needed?
- › Detecting and isolating attacks in networks
- › Distributed optimal control of AC and DC microgrids
- › Switched control of DC microgrids
- › Solving power flow equations



Question/remarks?

