36th Benelux Meeting on Systems and Control

March 28 – 30, 2017

Spa, Belgium

Program
The 36th Benelux Meeting on Systems and Control is supported by

Paul Van Dooren and Julien Hendrickx
Book of Abstracts 36th Benelux Meeting on Systems and Control

Université catholique de Louvain

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Paul M. J. Van den Hof

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Hussein Altartouri  
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</tr>
<tr>
<td>WeP02-3</td>
<td>Learning sparse models of diffusive graph signals</td>
<td>14.10-14.30</td>
<td>Dong, Shuyu, UCLouvain, Thanou, Dorina, EPFL, Switzerland, Absil, P.-A., UCLouvain, Frossard, Pascal</td>
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WeP02-4 14.30-14.50
Control of LTI Systems with Stochastic Initial Conditions
Martijn Dresscher University of Groningen
Bayu Jayawardhana University of Groningen

WeP02-5 14.50-15.10
Extremum-seeking control for nonlinear plants with time-varying steady-state outputs
Leroy Hazeleger Eindhoven University of Technology
Nathan van de Wouw
Henk Nijmeijer
L. Hazeleger

WeP02-6 15.10-15.30
On aggregators and households in smartgrid capacity management
K. van Geffen University of Groningen
M.K. Camlibel University of Groningen
J.M.A. Scherpen University of Groningen

WeP03 Games, Agents and Networks 2
Chair: Jean-Charles Delvenne 13.30-15.30

WeP03-1 13.30-13.50
Asynchronous Agreement through Distributed Coordination Algorithms Associated with Periodic Matrices
Yuzhen Qin University of Groningen
Ming Cao University of Groningen

WeP03-2 13.50-14.10
The optimal strategy to control a non linear monotone system with unilateral interactions
Domenico Brunetto Politecnico di Milano
Julien M. Hendrickx Université Catholique de Louvain

WeP03-3 14.10-14.30
Resilient Self-triggered Network Synchronization
Danial Mohammadi Senejohnny University of Groningen
Pietro Tesi University of Groningen
Claudio De Persis University of Groningen

WeP03-4 14.30-14.50
Formation scaling control using tensegrities from graph theory
Qingkai Yang University of Groningen
Ming Cao University of Groningen

WeP03-5 14.50-15.10
How difficult is it to control cascading behaviors in networks?
Wilbert Sammel Rossi University of Twente
Giacomo Como Lund University
Fabio Fagnani Politecnico di Torino

WeP03-6 15.10-15.30
A Distance-Based Approach to Strong Target Control of Dynamical Networks
Henk J. van Waaerde Rijksuniversiteit Groningen
M. Kanat Camlibel Rijksuniversiteit Groningen
Harry L. Trentelman Rijksuniversiteit Groningen

WeP04 Non-Linear Control 1
Chair: Henk Nijmeijer 13.30-15.30

WeP04-1 13.30-13.50
Control of mechanical systems with uncertain set-valued friction
Ruud Beerens Eindhoven University of Technology
Nathan van de Wouw Eindhoven University of Technology
Maurice Heemels Eindhoven University of Technology
Henk Nijmeijer

WeP04-2 13.50-14.10
Control of platooning vehicles: separating path following from tracking
E Lefeber Eindhoven University of Technology
J. Ploeg Netherlands Organisation for Applied Scientific Research TNO

WeP04-3 14.10-14.30
Tube-based anticipative linear parameter-varying MPC: application to non-linear systems
Jurre Hanema Eindhoven University of Technology
Roland Tth Eindhoven University of Technology
Mircea Lazar Eindhoven University of Technology

WeP04-4 14.30-14.50
Hybrid integrator design for improved tracking in motion control
D.A. Deenen Eindhoven University of Technology
M.F. Heertjes ASML
W.P.M.H. Heemels Eindhoven University of Technology
H. Nijmeijer

WeP04-5 14.50-15.10
Particle filtering in high dimension
Wei Wang University of Twente
Pranab K. Mandal University of Twente

WeP04-6 15.10-15.30
Sub-Optimal Extremum Seeking with System Dynamics
Christophe Labar Université Libre de Bruxelles
Emanuele Garone Université Libre de Bruxelles
Michel Kinnaert Université Libre de Bruxelles

WeP05 Modeling for Control 1
Chair: Siep Weiland 13.30-15.30

WeP05-1 13.30-13.50
Modeling and Control of Thermal Pixels
Paul Padilla Eindhoven University of Technology
Siep Weiland Eindhoven University of Technology
Gregor van Baars TNO

WeP05-2 13.50-14.10
Robust management and control of smart multi-carrier energy systems
Tomas Pippia Delft University of Technology
Joris Sjö Delft University of Technology
Bart De Schutter Delft University of Technology
### WeP05-3
**A Linear Control Toolbox - towards simple LPV control**
Maarten Verbandt, KU Leuven
Jan Swevers, KU Leuven
Goele Pipeleers, KU Leuven

### WeP05-4
**Energy-based Modeling of the Ocean Grazer Power Take-off System**
J.J. Barradas-Berglind, University of Groningen
M. Munoz-Arias, Costa Rica Institute of Technology
Y. Wei, University of Groningen
W.A. Prins, A.I. Vakis, B. Jayawardhana

### WeP05-5
**Model-based control of a twin screw extruder**
Grimard Jonathan, Université de Mons
Laurent Dewasme, Université de Mons
Alain Vande Wouwer, Université de Mons

### WeP05-6
**Parameter estimation for a large-scale multi-physics mirror heating model**
D.P.M. van den Hurk, Eindhoven University of Technology
M.B.I. Habets, Eindhoven University of Technology
S. Weiland, Eindhoven University of Technology

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### WeE02
**Decision Making Processes**
Wellington
Chair: Paul Van Dooren

#### WeE02-1
**Generalized aggregative games: convexity does not imply monotonicity**
Giuseppe Belgioioso, Eindhoven University of Technology
Sergio Grammatico, Eindhoven University of Technology

#### WeE02-2
**The Role of Perception Heterogeneity in Linear Threshold Decision-Making Dynamics**
Pouria Ramazi, University of Groningen
Ming Cao, University of Groningen

#### WeE02-3
**Towards an efficient multi-objective decision making strategy: application to an individual based model for competitive factories**
Ihab Hashem, KU Leuven
Philippe Nimmmegeers, KU Leuven
Dries Telen, KU Leuven
Jan Van Impe

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### WeE03
**Games, Agents and Networks**
Source
Chair: Julien Hendrickx

#### WeE03-1
**Quantifying the unpredictability of opinion revision mechanisms**
Vande Kerckhove Corentin, Université catholique de Louvain
Martin Samuel, Université de Lorraine
Hendrickx Julien, Université catholique de Louvain
Gend Pascal

#### WeE03-2
**# TwitterDiffusion # TemporalPatterns # CascadeMigration**
Martin Gueuning, UNamur/UCLouvain
Renaud Lambiotte, UNamur
Jean-Charles Delvenne, UCLouvain
Ayan Kumar Bhowmick, Bivas Mitra

#### WeE03-3
**Sector Congestion and Criticality Measures for Flights in ATM**
Gonzé Francois, Université catholique de Louvain
Andrea Simonetto, Université catholique de Louvain
Etienne Hues, Université catholique de Louvain
Jean Boucquey, Raphael M. Jungers

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### WeE04
**Non-Linear Control**
Pouhon Pia
Chair: Bayu Jayawardhana

#### WeE04-1
**Power and limitations of tensor decomposition for monitoring and quality prediction of batch processes**
Carlos Andre Munoz, KU Leuven
Philippe Nimmmegeers, KU Leuven
Dries Telen, KU Leuven
Jan Van Impe
The partial contraction approach for convergence analysis in the tracking control of mechanical port-Hamiltonian systems

Rodolfo Reyes-Baez  University of Groningen
Arjan van der Schaft  University of Groningen
Bayu Jayawardhana  University of Groningen

Filtered Split-Path Nonlinear Integrator for Improved Transient Performance

Annemiek van der Maas  Eindhoven University of Technology
Maurice Heemels  Eindhoven University of Technology
Nathan van de Wouw  Eindhoven University of Technology

A General Framework for Subtractive Feedforward Control

Raffaele Romagnoli  Université Libre de Bruxelles
Emanuele Garone  Université Libre de Bruxelles

Development of a powertrain design optimization tool for hybrid electric heavy-duty vehicles

F.J.R. Verbruggen  Eindhoven University of Technology
T.Hofman  Eindhoven University of Technology

Optimal design for hybrid vehicles with switching dynamics

Massimo De Mauri  KU Leuven
Goele Pipeleers  KU Leuven
Jan Swevers  KU Leuven
Joris Gillis

Vehicle Energy Management with an on/off controlled refrigerated semi-trailer: Fuel reduction vs. Switching frequency

T.C.J. Romijn  Eindhoven University of Technology
M.C.F. Donkers  Eindhoven University of Technology
S.Weiland  Eindhoven University of Technology
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| ThM02-3 | 09.10-09.30 | Parametric model order reduction for large-scale and complex systems | Daming Lou, Eindhoven University of Technology  
Siep Weiland, Eindhoven University of Technology |
| ThM02-4 | 09.30-09.50 | Simulation of an Electrochemistry-based Model for Lithium-Ion Batteries | E. Najafi, Eindhoven University of Technology  
L. Xia, Eindhoven University of Technology  
H.J. Bergveld, Eindhoven University of Technology  
M.C.F. Donkers |
| ThM02-5 | 09.50-10.10 | On mathcalH₂ Optimal Model Order Reduction for Linear Parameter-Varying Systems | X. Cao, Eindhoven University of Technology  
J.M.L. Maubach, Eindhoven University of Technology  
W.H.A. Schilders, Eindhoven University of Technology  
S. Weiland |
| ThM02-6 | 10.10-10.30 | Empirical Differential Gramians | Yu Kawano, University of Groningen  
Jacquielien M.A. Scherpen, University of Groningen |
| ThM03-1 | 08.30-08.50 | Synchronization threshold of time-delayed Hindmarsh-Rose neurons: the effects of an external parameter | Isaac Topiltzin Castanedo Guerra, Eindhoven University of Technology  
Erik Steur, Eindhoven University of Technology  
Henk Nijmeijer, Eindhoven University of Technology  
Isaac Topiltzin Castanedo Guerra |
| ThM03-2 | 08.50-09.10 | A Non-equilibrium Thermodynamic Model for Multiphase Systems | Aarón Romo-Hernández, Université catholique de Louvain  
Denis Dochain, Université catholique de Louvain  
Nicolas Hudon, Queen’s University  
Erik B. Ydstie |
| ThM03-3 | 09.10-09.30 | Reference-tracking feedforward design for linear parameter varying systems | Yanin Kasemsinsup, Eindhoven University of Technology  
Hans Butler, Eindhoven University of Technology, ASML  
Siep Weiland, Eindhoven University of Technology  
Marcel Heertjes |
| ThM03-4 | 09.30-09.50 | Slow-fast port-Hamiltonian mechanical systems | Hildeberto Jardón Kojakhmotov, University of Groningen  
Mauricio Muoz Arias, University of Groningen  
Jacquielien M.A. Scherpen, University of Groningen |
| ThM03-5 | 09.50-10.10 | Port-based model for burning plasma in Tokamaks | Benjamin Vincent, Université Catholique de Louvain  
Nicolas Hudon, Queen’s University  
Denis Dochain, Université Catholique de Louvain  
Laurent Lefèvre, Université Grenoble Alpes, LCIS |
| ThM03-6 | 10.10-10.30 | Resource-aware Cooperative Driving | Victor Dolk, TU/e  
Niek Borgers, TU/e  
Maurice Heemels, TU/e |
| ThM04-1 | 08.30-08.50 | Analysis of a biochemical oscillator model describing the developmental stage of mycobacteria | Hadi Taghvafard, University of Groningen  
Hildeberto Jardón-Kojakhmotov, Eindhoven University of Technology  
Ming Cao, University of Groningen |
| ThM04-2 | 08.50-09.10 | Influence of plant physiology on greenhouse energy efficiency: a model sensitivity analysis | David Katzin, Wageningen University  
Wouter Kuijpers, Eindhoven University of Technology  
Simon van Mourik, Wageningen University  
Rene van de Molengraft, Eldert J. van Henten |
| ThM04-3 | 09.10-09.30 | Optimization of continuous cultures of Dunaliella tertiolecta using extremum-seeking | Feudjio Letchindjio, Christian Gabin, Université de Mons  
Dewasne Laurent, Université de Mons  
Vande Wouwer Alain, Université de Mons |
| ThM04-4 | 09.30-09.50 | Derivation of a reduced-order model for anaerobic digestion control | Giannina Giovannini, Université de Mons  
Mihaela Sbarciog, Université de Mons  
Rolando Chamy, PUCV  
Alain Vande Wouwer |
| ThM04-5 | 09.50-10.10 | Optimization of a Fructo-Oligosaccharides production process | Julien Schorsch, Université libre de Bruxelles  
Michel Kinnaert, Université libre de Bruxelles |

Book of Abstracts  
36th Benelux Meeting on Systems and Control
ThM04-6 10.10-10.30
Observability Analysis of a Microalgae Culture Model

Feudjio Letchindjio Christian Gabin Université de Mons
Cremer Céline Université de Mons
Deschenes Jean-Sebastien Université du Quebec Rimouski
Vande Wouwer Alain

ThM05 08.30-10.30
Bio-Medical Applications
Chair: Frédéric Crevecoeur

ThM05-1 08.30-08.50
Retina tracking using an Optical Coherence Tomography probe
Yanick G.M. Douven Eindhoven University of Technology
Marinus J.L. van de Molengraft Eindhoven University of Technology
Maarten Steinbuch Eindhoven University of Technology

ThM05-2 08.50-09.10
Measurement of the skin moisture with transparent impedance sensor
Francois Wielant Université catholique de Louvain
Allan Barrea Université catholique de Louvain
Philippe Lefèvre Université catholique de Louvain
Jean-Louis Thonnard

ThM05-3 09.10-09.30
Knee advanced rehabilitation device
Robin Wilmart Université Libre de Bruxelles
Emanuele Garone Université Libre de Bruxelles
Bernardo Innocenti Université Libre de Bruxelles

ThM05-4 09.30-09.50
Modeling, analysis and control of pharmacokinetic models: application to meropenem
Pauline Themans University of Namur
Flora T. Musuamba Université de Limoges
Joseph J. Winkin University of Namur

ThM05-5 09.50-10.10
Comparison of batch effects removal methods in classification task
Emilie Renard Université catholique de Louvain
P.-A. Absil Université catholique de Louvain

ThM05-6 10.10-10.30
Adaptive neural control of reaching movements
Crevecoeur ICTEAM/UCLouvain
Lefèvre ICTEAM/UCLouvain

P5 Pierre Le Grand
Mini-course 3
Pablo Parrilo
Chair: Julien Hendrickx 11.00–12.00

Event: P7 Pierre Le Grand
Best Junior Presentation Award
Chair: Joseph Winkin 12.30–13.00

Event: P6 Pierre Le Grand
DISC Awards
Chair: Henk Nijmeijer 12.00–13.00
Part 2

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Part 3

Organizational Comments
Welcome

The Organizing Committee has the pleasure of welcoming you to the 36th Benelux Meeting on Systems and Control, at Sol Cress, Spa, Belgium.

Aim

The aim of this meeting is to promote research activities and cooperation between researchers in Systems and Control. It is the thirty-sixth in a series of annual conferences that are held alternately in Belgium and The Netherlands. The meeting takes place under the auspices of the DYSCO (Dynamical Systems, Control and Optimization) network and is organized by UCLouvain.

Scientific Program Overview

1. A plenary lecture by Frank Allgöwer (University of Stuttgart, Germany) on Networked and Optimization-based Control for Industry: which way to go?

2. A plenary lecture by Mario Sznaier (Northeastern University, Boston, USA) on The Interplay between Big Data and Sparsity in System Theory.

3. A three hour Mini-course by Pablo Parrilo (Massachusetts Institute of Technology, Cambridge, USA) on Convex Relaxations in Optimization, Systems and Control.

4. Contributed short lectures. See the list of sessions for the titles and authors of these lectures.

Directions for speakers

For a contributed lecture, the available time is 20 minutes. Please leave two minutes for discussion and room changes, and adhere to the indicated schedule. In each room beamers are available. When using a beamer, you have to provide a notebook yourself and you have to start your lecture with the notebook up and running and the external video port switched on.

Registration

The Benelux Meeting registration desk, will be open on Tuesday, March 28, from 10:00 to 14:00. Late registrations can be made at the Benelux Meeting registration desk, when space is still available. The on-site fee schedule is:

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>single room</td>
<td>515</td>
</tr>
<tr>
<td>twin room</td>
<td>435</td>
</tr>
<tr>
<td>triple room</td>
<td>395</td>
</tr>
<tr>
<td>one day (no dinner)</td>
<td>225</td>
</tr>
</tbody>
</table>

The registration fee includes:

- Admission to all sessions.
- The Book of Abstracts on a memory stick.
- Coffee and tea during the breaks.
- In the case of an accommodation arrangement: lunch and dinner on Tuesday, breakfast, lunch, and dinner on Wednesday, and breakfast and lunch on Thursday.
- In the case of a “one day” arrangement: lunch on Tuesday, or Wednesday, or Thursday.
- Free use of a wireless Internet connection (WiFi) wherever technically available

The registration fee does not include:

- Cost of phone calls
- Special ordered drinks during lunch, dinner, in the evening, etc.

Organization

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The meeting has been organized by Paul Van Dooren and Julien Hendrickx (Université catholique de Louvain), in collaboration with the members of the Organizing Committee. The administrative and technical help of Marie-Christine Joveneau, Ludovic Taffin, François Wielant and Etienne Huens were greatly appreciated as well.

Sponsor

The meeting is supported by the following organizations:

• BELSPO, the Belgian Science Policy Office via the IAP Programme
• UCL/INMA, the Department of Mathematical Engineering of the Université catholique de Louvain
• DYSICO, the network on DYnamical Systems, Control and Optimization
Conference location

The lecture rooms of Sol Cress are situated on the lower level (Level 0). Consult the map at the end of this booklet to locate rooms. During the breaks, coffee and tea will be served in the foyer. Announcements and personal messages will be posted near the registration desk. Accommodation is provided in the conference center. Breakfast will be served between 7:30 and 8:30. Room keys can be picked up at lunch time on the first day and need to be returned before 10:00 on the day of departure. Parking is free of charge.

The address of Sol Cress is

Corsendonk Sol Cress
Spaloumont, 5
4900 Spa - Belgique
Tel: +32 (0) 87 77 23 53
Belgium

Facilities

The facilities at Sol Cress include a restaurant, bar, and recreation facilities. You can refer to the reception desk of the center for detailed information about the use of these facilities.

Best junior presentation award

Continuing a tradition that started in 1996, the 36th Benelux Meeting will close with the announcement of the winner of the Best Junior Presentation Award. This award is given for the best presentation, given by a junior researcher, and it consists of a trophy that may be kept for one year and a certificate. The award is specifically given for quality of presentation rather than quality of research, which is judged in a different way. At the meeting, the chairs of sessions will ask three volunteers in the audience to fill out an evaluation form. After the session, the evaluation forms will be collected by the Prize Commissioners who will then compute a ranking. The winner will be announced on Thursday, March 30, in room Pierre Le Grand, at 12:30. The evaluation forms of each presentation will be returned to the junior researcher who gave the presentation. The Prize Commissioners are Joseph Winkin (Université de Namur), Wim Michiels (Katholieke Universiteit Leuven) and Bayu Jayawardhana (University of Groningen).

The organizing committee counts on the cooperation of the participants to make this contest a success.

Website

An electronic version of the Book of Abstracts can be downloaded from the Benelux Meeting web site.

Meetings

The following meetings are scheduled:

• Board DISC on Wednesday, March , 19:30 – 21:30 (during dinner).
• Management Team DISC on Wednesday, March 29, room Wellington, 21:30 – 22:30.

DISC certificates and best thesis award

The ceremony for the distribution of the DISC certificates and for the Best Thesis Award will be held on Thursday, March 30, room Pierre Le Grand, 12:30–13:00.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Location</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>10:30 – 11:30</td>
<td>Welcome and Opening</td>
<td>Pierre Le Grand</td>
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<tr>
<td>11:20 – 12:30</td>
<td>Coffee</td>
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<td>12:30 – 14:00</td>
<td>Lunch</td>
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<td>14:00 – 14:20</td>
<td>TuP01</td>
<td>Darwish, Steinhanser, Dressen, Blomme, van der Weijst, Noel</td>
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<td>14:20 – 14:40</td>
<td>TuP02</td>
<td>Weerts, Gelders, Groesbeek, de Rozaaro, Nienstadt</td>
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<td>TuP03</td>
<td>Dreesen, Lamour, van den Heuveld, Blanken</td>
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<td>15:00 – 15:20</td>
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<td>18:30 – 19:00</td>
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<td>19:00 – 19:30</td>
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<td>19:30 – 21:00</td>
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## Wednesday March 29, 2017

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<th>Room</th>
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<tr>
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<td>Pierre Le Grand</td>
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<td>Wellington</td>
<td>Mechanical Engineering</td>
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<td>8:50 – 9:10</td>
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<td>Hendrickx</td>
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<td>9:10 – 9:30</td>
<td>Brena-Casasola</td>
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