

# **The 6<sup>th</sup> International Conference on Positive Systems**

## **Final Program**

### **Locally Sponsored by**

Hangzhou Dianzi University

### **Co-Sponsored by**

Southwest University for Nationalities

Dalian University of Technology

Campus Bio-Medico University of Rome

Nanjing University of Science and Technology

Guangdong University of Technology

Zhejiang Provincial Natural Science Foundation of China

Zhejiang Institute of Signal Processing

Zhejiang Institute of Electronics

August 25-27, 2018, Hangzhou, China

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## Welcome Address

It gives us enormous pleasure to welcome you all to Hangzhou and to the 6th International Conference on Positive Systems (POSTA2018) on behalf of Sapienza University of Rome and the Program and Organizing Committees of POSTA2018. The International Conference on Positive Systems is an academic conference sponsored by Sapienza University of Rome and has held five sessions since 2003. Previous editions of the conference were held in Rome, Italy (2003), Grenoble, France (2006), Valencia, Spain (2009), Maynooth, Ireland (2012) and Rome, Italy (2016). POSTA2018 aims to provide a forum for scientists and engineers over the world to present their new theoretical results and techniques in the field of positive systems. POSTA2018 will host plenary invited sessions on a range of topics concerning positive systems as well as original contributed papers.

POSTA2018 will take place at Hangzhou Dianzi University, Hangzhou, China from August 25th to 27th, 2018. Hangzhou is one of the important tourism cities in China, famous for its natural beauty and historical and cultural heritage. POSTA2018 is sponsored by Sapienza University of Rome, and locally organized by Hangzhou Dianzi University, China. The Conference is also technically co-sponsored by Southwest University for Nationalities, Dalian University of Technology, Campus Bio-Medico University of Rome, Nanjing University of Science and Technology, Guangdong University of Technology, Zhejiang Provincial Natural Science Foundation of China, Zhejiang Institute of Signal Processing, Zhejiang Institute of Electronics.

POSTA2018 received a total of 70 submissions with authors from various countries and regions. Based on a rigorous peer-review process, 48 papers were accepted and included in the conference proceedings. The program is scheduled over 14 parallel oral sessions, covering new developments concerning theory and applications of positive systems. The conference language is English. We are delighted to present to POSTA2018 participants three plenary sessions, delivered by distinguished speakers including: Professor Frédéric Mazenc (Université Paris-Sud, France), Professor Daizhan Cheng (Chinese Academy of Sciences, China), Professor Yoshio Ebihara (Kyoto University, Japan).

Excellent success of POSTA2018 program would not be possible without the participation and contribution of the authors, plenary speakers, invited session organizers, session chairs, reviewers and volunteers. We sincerely thank all individuals who have contributed to POSTA2018. Special thanks are extended to reviewers and the Program Committee members for their effort, and to the Organizing Committee members and volunteers for their dedicated work. We would like to express our gratitude to plenary speakers, the authors and participants. It is you who are at the center stage of POSTA2018 and make the conference a memorable event!

We hope you enjoy the conference as well as Hangzhou.

# The 6<sup>th</sup> International Conference on Positive Systems

## Conference Committees

### Host Institutions

Hangzhou Dianzi University

### Co-Sponsors

Southwest University for Nationalities

Dalian University of Technology

Campus Bio-Medico University of Rome

Nanjing University of Science and Technology

Guangdong University of Technology

Zhejiang Provincial Natural Science Foundation of China

Zhejiang Institute of Signal Processing

Zhejiang Institute of Electronics

### Organizing Committee

**General Chair:** James Lam (The University of Hong Kong, Hong Kong)

**General Co-Chairs:** Filippo Cacace (Campus Bio-Medico University of Rome, Italy)

Lorenzo Farina (Sapienza University of Rome, Italy)

Xingwen Liu (Southwest University for Nationalities, China)

Xudong Zhao (Dalian University of Technology, China)

### Program Committee

**Program Chair:** Yun Chen (Hangzhou Dianzi University, China)

**Program Co-Chairs:** Junfeng Zhang (Hangzhou Dianzi University, China)

Yanwu Wang (Huazhong University of Science and Technology, China)

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Jinde Cao (Southeast University, China)

Xiaoming Chen (Nanjing University of Aeronautics and Astronautics, China)

Patrizio Colaneri (Politecnico di Milano, Italy)

Yoshio Ebihara (Kyoto University, Japan)

Jun'e Feng (Shandong University, China)

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Ivan Ivanov (Sofia University, Bulgaria)  
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Anke Kalauch (Technische Universität Dresden, Germany)  
Tomas Laffey (University College Dublin, Ireland)  
Haitao Li (Shandong Normal University, China)  
Jinling Liang (Southeast University, China)  
Jianquan Lu (Southeast University, China)  
Costanzo Manes (University of L'Aquila, Italy)  
Oliver Mason (Hamilton Institute, Ireland)  
Frédéric Mazenc (Université Paris-Sud, France)  
Ziyang Meng (Tsinghua University, China)  
Phan Thanh Nam (Quynhon University, Vietnam)  
Tarek Raïssi (Conservatoire National des Arts et Métiers, France)  
Anders Rantzer (Lund University, Sweden)  
Sergio Romero-Vivó (Universitat Politècnica de València, Spain)  
Björn Rüffer (The University of Newcastle, Australia)  
Jun Shen (Nanjing University of Aeronautics and Astronautics, China)  
Robert Shorten (Hamilton Institute, Ireland)  
Zhan Shu (University of Southanpton, UK)  
Housheng Su (Huazhong University of Science and Technology, China)  
Chengjun Sun (Kunming University of Science and Technology, China)  
Yuangong Sun (University of Jinan, China)  
Fernando Tadeo (University of Valladolid, Spain)  
Mathukumalli Vidyasagar (The University of Texas at Dallas, USA)  
Maria Elena Valcher (Università di Padova, Italy)  
Cuihong Wang (Shanxi Normal University, China)  
Yanwu Wang (Huazhong University of Science and Technology, China)  
Fabian Wirth (University of Passau, Germany)  
Zhengrong Xiang (Nanjing University of Science and Technology, China)  
Xiaoping Xue (Harbin Institute of Technology, China)  
Liguo Zhang (Beijing University Of Technology, China)  
Lixian Zhang (Harbin Institute of Technology, China)  
Qingling Zhang (Northeastern University, China)  
Wei Xing Zheng (University of Western Sydney, Australia)  
Shaosheng Zhou (Hangzhou Dianzi University, China)  
Shuqian Zhu (Shandong University, China)

## Registration Committee

**Registration Chair:** Jiangzhong Wang (Hangzhou Dianzi University, China)

**Registration Co-Chairs:** Shizhou Fu (Hangzhou Dianzi University, China)

Panshuo Li (Guangdong University of Technology, China)

## Session Organizing Committee

**Organizing Chair:** Quanbo Ge (Hangzhou Dianzi University, China)

**Organizing Co-Chairs:** Jinling Liang (Southeast University, China)

Jun'e Feng (Shandong University, China)

Hiroshi Ito (Kyushu Institute of Technology, Japan)

**Members:** Jianning Li (Hangzhou Dianzi University, China)

Guangxin Zhong (Hangzhou Dianzi University, China)

## Important Information

- **Time:** August 25-27, 2018
- **Venue:** Science Museum in Hangzhou Dianzi University (Xiasha campus)
- **Agenda:** August 25-27, 2018, Academic lectures and discussions
- **Official Language:** English

### Registration

- **Registration Time:** August 24, 9:00-18:00; August 25, 8:00-18:00; August 26, 8:00-16:00
- **Registration Desk:** Science Museum in Hangzhou Dianzi University (Xiasha campus)

### Contacting the Registration Committee

- **Contacting Persons:** Junfeng Zhang (+86 18868706298), Xianglei Jia (+86 17858836169)  
E-mail: [posta2018@hdu.edu.cn](mailto:posta2018@hdu.edu.cn)
- **Website of POSTA2018:** <http://posta2018.hdu.edu.cn/>

## Transportation and Venue Location

### Transportations

#### 1. Hangzhou Xiaoshan International Airport → Science Museum in Hangzhou Dianzi University

##### By Airport bus (★Recommended)

**Route:** Airport bus Xiasha Line

Get on the Airport bus in Airport → Get off the Airport bus in Grand New Century Hotel → Walk 850m north along Wenze Road to Science Museum in Hangzhou Dianzi University

**Fare:** 20 RMB

##### By Taxi

**Route:** Drive along airport expressway & Shanghai Kunming expressway & No. 21 Street & No. 6 Street.

**Distance:** About 21.4 km    **Time:** About 40 minutes    **Fare:** About 120 RMB

#### 2. Hangzhou Railway Station (Chengzhan Railway Station) → Science Museum in Hangzhou Dianzi University

##### By Metro (★Recommended)

##### Metro Entrance Location:

When you arrive at Hangzhou Railway Station, go straight from the exit to the ground floor, then you will see the subway station entrance.

**Route:** Metro Line 1

Get on the Metro Line 1 (Xianghu → Xiasha Jiangbin) in Chengzhan Station → Get off the Subway in Wenze Road → Walk 200m to Science Museum in Hangzhou Dianzi University (Please note that Metro Line 1 has two directions: one is bound for Xiasha Jiangbin direction and the other one is bound for Linping direction. You need to take the Xiasha Jiangbin direction).

**Fare:** 6 RMB

##### By Taxi

**Route:** Drive along Viaduct of Zhonghe & Viaduct of Shang Tong & Desheng Expressway.

**Distance:** About 27 km    **Time:** About 45 minutes    **Fare:** About 150 RMB

#### 3. Hangzhou East Railway Station → Science Museum in Hangzhou Dianzi University

##### By Metro (★Recommended)

##### Metro Entrance Location:

Go out the Exit on the ground floor of the terminal, take the staircase and get to the second floor of the underground, then you can see the Metro Entrance.

**Route:** Metro Line 1

Get on the Metro Line 1 (Xiasha Jiangbin direction) in East Railway Station → Get off the Metro in Wenze Road → Walk 200m to Science Museum in Hangzhou Dianzi University

**Fare:** 5 RMB

##### By Taxi

**Route:** Drive along Tiancheng Road & Ring Station East Road & Desheng Expressway & Wenze Road.

**Distance:** About 17km    **Time:** About 30 minutes    **Fare:** About 80 RMB





Note: Take the Metro Line 1 (Xiasha Jiangbin direction)

### Science Museum in Hangzhou Dianzi University Floor Plan



**Note:** If you take the subway to get off at Wenze Road station, please go to the Science Museum in Hangzhou Dianzi University according to the route shown above.



**Note:** If you take the airport bus to get off at the Grand New Century Hotel, Hangzhou, please go to the Science Museum in Hangzhou Dianzi University according to the route shown above.

## Plenary Lectures

### Plenary Lecture 1

August 25, 08:50-09:50

Science Museum in Hangzhou Dianzi University Lecture Hall

**Frédéric Mazenc**

Université Paris-Sud, France

**Title:** Stability of Positive Systems With Delay: Changes of Coordinates, Comparison Systems, Lyapunov Functionals

**Abstract:** We review tools and techniques arising from the theory of positive and cooperative systems that are useful in the stability analysis of systems with delay. First, we present changes of coordinates, possibly time-varying, transforming linear systems into positive systems. Both the continuous-time and the discrete-time cases are considered. Second, we describe a systematic approach of construction of cooperative comparison systems for nonlinear time-varying systems. Third, we review some stability results that are based on Lyapunov functions and Lyapunov functionals for systems with pointwise or distributed delays.



**Frédéric Mazenc** received his Ph.D. in Automatic Control and Mathematics from the CAS at Ecole des Mines de Paris in 1996. He was a Postdoctoral Fellow at CESAME at the University of Louvain in 1997. From 1998 to 1999, he was a Postdoctoral Fellow at the Centre for Process Systems Engineering at Imperial College. He was a CR at INRIA Lorraine from October 1999 to January 2004. From 2004 to 2009, he was a CR1 at INRIA Sophia-Antipolis. Since 2010, he has been a CR1 at INRIA Saclay. He received a best paper award from the IEEE Transactions on Control Systems Technology at the 2006 IEEE Conference on Decision and Control. His current research interests include nonlinear control

theory, differential equations with delay, robust control, and microbial ecology. He has more than 200 peer reviewed publications. Together with Michael Malisoff, he authored a research monograph entitled *Constructions of Strict Lyapunov Functions* in the Springer Communications and Control Engineering Series.



## Plenary Lecture 2

August 26, 08:30- 09:30

Science Museum in Hangzhou Dianzi University Lecture Hall

**Daizhan Cheng**

Chinese Academy of Sciences, China

**Title:** Semi-Tensor Product of Matrices and Its Applications

**Abstract** In this talk a generalized matrix product, called semi-tensor product (STP) of matrices, is introduced. Some fundamental properties are obtained. Using STP, a logical system can be converted into an algebraic system (precisely, a Boolean-valued system), which is called the algebraic state space representation (ASSR). Then the conventional mathematical computations and techniques for matrix analysis and difference equation etc. are applicable to logical systems. Then two applications are introduced:

- **Boolean (Control) Networks:**  
The topological structure of Boolean networks is investigated. The control theory of Boolean networks, including controllability/observability, disturbance decoupling, optimal control, stability and stabilization, etc. is established. As an example, the controllability is discussed in detail.
- **Finite Games:**  
The strategies of finite games are expressed as Boolean vectors, the payoffs are converted into pseudo-logical functions. Then the evolutionary finite games are described as logical dynamic systems, which are then converted to algebraic systems. Verification of finite potential games is solved. The vector space structure of finite games is presented.



**Daizhan Cheng** graduated from Tsinghua University in 1970, received M.S. from Graduate School, Chinese Academy of Sciences in 1981, and Ph.D. from Washington University, St. Louis, in 1985. Since 1990, he is a professor with Institute of Systems Science, AMSS, Chinese Academy of Sciences. He is the author/coauthor of 14 Books, over 250 Journal Papers and over 150 Conference Papers. He was member of IEEE CSS Board of Governors (2009, 2015), and IFAC Council Member (2011-2014). He is IEEE Fellow (2006-), IFAC Fellow (2008-). He received Second National Natural Science Award twice (in 2008 and 2014), Outstanding Science and Technology Achievement Price of CAS (2015), and the Automatica Best Paper Award (2008-2010), bestowed by IFAC.

**Plenary Lecture 3**

August 26, 09:30-10:30

Science Museum in Hangzhou Dianzi University Lecture Hall

**Yoshio Ebihara**

Kyoto University, Japan

**Title:** Control Synthesis under Positivity Constraint: Beautiful Results and Challenging Issues

**Abstract:** When we design controllers for positive systems, it is quite natural to require that the resulting closed-loop systems remain to be positive. In the first part of this talk, we review some recent results on the state-feedback controller synthesis under the positivity constraint on the closed-loop systems. As a performance index, we focus on the  $L_p$ -induced norm from the disturbance input to the performance output, and show that in the case of positive systems the  $L_p$ -induced norm can be characterized by linear programming (LP) or semidefinite programming (SDP) with diagonal Lyapunov matrices. These results successfully enable us to design the optimal state-feedback gains under the positivity constraint, even under some additional sparse structure constraints on the gains to be designed. In the second part of this talk, on the other hand, we show an application result of positive system theory in formation control of multi-agent systems. Here we focus on an interconnected system constructed from positive subsystems and nonnegative interconnection matrix, where the interconnection matrix determines the communication exchange over the subsystems. Furthermore, we consider the case where an external input is applied to the interconnected system. By analyzing the steady-state output of the interconnected system with respect to the ramp external input, we derive synthesis conditions on the interconnection matrix to achieve formation-control-oriented design objectives. The usefulness of the theoretical results are illustrated by numerical simulation on time-headway control of vehicle platoons. Then, in the final part of this talk, we discuss challenging issues related to the positivity-constrained control synthesis problems. Even though we can obtain LP- or SDP-based conditions for the optimal controller synthesis if we impose the positivity for the whole closed-loop system, such positivity cannot be enforced for instance if a performance signal naturally takes negative values. This typically happens in the case where we evaluate the control input signal as one of the performance output signals. In such a case, convex formulation for the optimal controller synthesis is hardly available, and hence we have to resort to some heuristic methods for an upper bound computation of the achievable performance and a suboptimal controller synthesis. For quantitative evaluation on how the upper bounds are close to the achievable performance, it is quite important to obtain tight lower bounds. For this challenging issue, we briefly introduce our recent results and discuss future directions.



**Yoshio Ebihara** was born in Fukuoka, Japan, in 1974. He received the B.E., M.E. and D.E. degrees in electrical engineering from Kyoto University, Kyoto, Japan, in 1997, 1999 and 2002, respectively. Since 2002, he has been with the Department of Electrical Engineering, Kyoto University, where he is an Associate Professor since 2010. In 2010, he held a visiting researcher position at LAAS-CNRS Toulouse, France. His research interests include convex optimization in control and positive system analysis and synthesis. Currently, he is an Associate Editor of IEEE Transactions on Control Systems Technology, Automatica, and a board member of IET Control Theory and Applications. He is also the Chair of IEEE CSS Technical Committee on Systems with Uncertainty.

## Program at a Glance

### The 6<sup>th</sup> International Conference on Positive Systems

Hangzhou, China

August 25-27, 2018

August 25 (Saturday)		August 26 (Sunday)		August 27 (Monday)	
08:30-08:50	Room: 205 Opening Ceremony	08:30-09:30	Room: 205 Plenary Lecture 2 by Daizhan Cheng	08:30-10:10	Oral Sessions MoA01 (Room: 205)
08:50-09:50	Plenary Lecture 1 by Frédéric Mazenc	09:30-10:30	Plenary Lecture 3 by Yoshio Ebihara	10:10-10:30	Tea Break
09:50-10:10	Tea Break	10:30-10:50	Tea Break	10:30-11:45	Oral Sessions MoA02 (Room: 205)
10:10-11:50	Oral Sessions SaA01 (Room: 205) Oral Sessions SaA02 (Room: 207)	10:50-11:40	Oral Sessions SuA01 (Room: 205) Oral Sessions SuA02 (Room: 207)		
11:50-13:30	Lunch Hangzhou Shujiang Hotel, The Second Floor	11:40-13:30	Lunch Hangzhou Shujiang Hotel, The Second Floor	11:45	Lunch Hangzhou Shujiang Hotel, The Second Floor
14:00-15:15	Oral Sessions SaB03 (Room: 205) Oral Sessions SaB04 (Room: 207)	13:30-14:45	Oral Sessions SuB03 (Room: 205) Oral Sessions SuB04 (Room: 207)		
15:15-15:35	Break	14:45-15:05	Break		
15:35-17:15	Oral Sessions SaB03 (Room: 205) Oral Sessions SaB04 (Room: 207)	15:05-16:20	Oral Sessions SuB03 (Room: 205) Oral Sessions SuB04 (Room: 207)		
17:30	Dinner Hangzhou Shujiang Hotel, The Second Floor	18:30-21:00	Banquet To be determined during the conference		

**Note:** Walking 100 meters northeast of Science Museum in Hangzhou Dianzi University, you can arrive at the Hangzhou Shujiang Hotel.

Room	August 25, Saturday	August 26, Sunday	August 27, Monday
205	SaA01	SuA01	MoA01, MoA02
207	SaA02	SuA02	
205	SaB03	SuB03	
207	SaB04	SuB04	



# Technical Program

## Saturday, August 25, 2018

<b>Opening Ceremony</b>	08:30-08:50	Room 205
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James Lam (General Chair)

Yun Chen (Program Chair)

<b>PL1</b> Plenary Lecture 1	08:50-09:50	Room 205
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Chair: James Lam

➤ PL-1	08:50-09:50	08:50-09:50
Frédéric Mazenc		Université Paris-Sud
<i>Stability of Positive Systems With Delay: Changes of Coordinates, Comparison Systems, Lyapunov Functionals</i>		

<b>Tea break</b>	09:50-10:10	
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<b>SaA01</b> Session 1: Positive Systems	10:10-11:50	Room 205
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Chair: Maria Elena Valcher

Co-Chair: Housheng Su

➤ SaA01-1		10:10-10:35
<i>On the Common Linear Copositive Lyapunov Functions for Compartmental Switched Systems</i>		
Maria Elena Valcher		Università di Padova

➤ SaA01-2		10:35-11:00
<i>Stability Analysis of Periodic Piecewise Positive Systems</i>		
Bohao Zhu		The University of Hong Kong
James Lam		The University of Hong Kong

➤ SaA01-3		11:00-11:25
<i>Semi-Global Observer-Based Positive Edge Consensus Subject to Positive Constraint and Input Saturation</i>		
Yaping Sun		Huazhong University of Science and Technology
Housheng Su		Huazhong University of Science and Technology
Xiaoling Wang		Huazhong University of Science and Technology

➤ SaA01-4		11:25-11:50
<i>Closed-Loop Nash Games for Interconnected Positive Nonlinear Systems With <math>H_\infty</math> Constraint</i>		
Hiroaki Mukaidani		Hiroshima University
Hua Xu		Hiroshima University

<b>SaA02</b>	10:10-11:50	Room 207
Session 2: Complex Networks		

Chair: Jun'e Feng

Co-Chair: Yuanyuan Wu

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► SaA02-1	10:10-10:35
<i>Oscillation Analysis of Abscisic Acid Signal Transduction Networks: A Semi-Tensor Product Approach</i>	
Shuqi Chen	Dalian University of Technology
Jiyan Zhang	Dalian University of Technology
Yuhu Wu	Dalian University of Technology

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► SaA02-2	10:35-11:00
<i>Bounded Synchronization for a Class of Coupled Complex Networks With Nonidentical Nodes</i>	
Yuanyuan Wu	Zhengzhou University of Light Industry
Jing Li	Zhengzhou University of Light Industry
Xiaoliang Qian	Zhengzhou University of Light Industry
Qing-E Wu	Zhengzhou University of Light Industry
Qingbo Li	Zhengzhou University of Light Industry

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► SaA02-3	11:00-11:25
<i>Identifiability of Boolean Networks via Output Data and Initial States</i>	
Yongyuan Yu	Shandong University
Jun-E Feng	Shandong University

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► SaA02-4	11:25-11:50
<i>A High-Order Stall Model for Spike Type Instability in Axial Compressors under Inlet Distortion</i>	
Peng Lin	Hangzhou Dianzi University

<b>SaB03</b>	14:00-17:15	Room 205
Session 3: Positive Systems		

Chair: Xiushan Cai

Co-Chair: Zbigniew Bartosiewicz

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► SaB03-1	14:00-14:25
<i>Stabilization Design for Uncertain Linear Positive Systems With Time-Delay</i>	
Yujie Zhao	Zhejiang Normal University
Linling Liao	Zhejiang Normal University
Xiushan Cai	Zhejiang Normal University
Yanhong Liu	Zhengzhou University

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► SaB03-2	14:25-14:50
<i>Exponential Stability of Nonlinear Positive Systems on Time Scales</i>	
Zbigniew Bartosiewicz	Bialystok University of Technology

► SaB03-3	14:50-15:15	
<i>Stability Analysis of Periodic Piecewise Linear Positive Systems With Unstable Subsystems</i>		
Yan Zheng		Hunan University
Yaonan Wang		Hunan University
► SaB03-4	15:35-16:00	
<i>Stability Analysis of Discrete-Time Switching Positive System With Delays: Homogeneous Polynomial Copositive Lyapunov Function Method</i>		
Shuai Li		Southwest Minzu University
Duyu Liu		Southwest Minzu University
► SaB03-5	16:00-16:25	
<i>Stability Analysis of Discrete-Time Periodic Positive Systems With Delays</i>		
Tiantong Pu		Southwest Minzu University
Qinzhen Huang		Southwest Minzu University
► SaB03-6	16:25-16:50	
<i>Stabilisation for Positive Switched T-S Fuzzy Delayed Systems Under Standard <math>L_1</math> and <math>L_\infty</math> Performance</i>		
Shuo Li		Hangzhou Dianzi University
► SaB03-7	16:50-17:15	
<i>Robust Stabilization for Constrained Switched Positive Linear Systems via Output-Feedback</i>		
Jinjin Liu		Henan University of Economics and Law
Shanen Yu		Hangzhou Dianzi University
Zhiqiang Li		Henan University of Economics and Law
Ting Zhang		Henan University of Economics and Law
<b>SaB04</b>	14:00-17:15	Room 207
Session 4: Observer		
Chair: Yanwu Wang		
Co-Chair: Jun Huang		
► SaB04-1	14:00-14:25	
<i>Stability and Observer Design of Impulsive Positive Systems With Time delay</i>		
Mengjie Hu		Huazhong University of Science and Technology
Yanwu Wang		Huazhong University of Science and Technology
Jiangwen Xiao		Huazhong University of Science and Technology
► SaB04-2	14:25-14:50	
<i>Finite Time Interval Observer Design for Discrete-Time Switched Systems</i>		
Jun Huang		Soochow University
Xiang Ma		Soochow University
Liang Chen		Soochow University
► SaB04-3	14:50-15:15	
<i>A Note on Interval Observer Design Based on Positive System Theory</i>		
Shenghui Guo		Suzhou University of Science and Technology
Wenyang Zhang		Suzhou University of Science and Technology
Jingyun Xu		Suzhou University of Science and Technology

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► SaB04-4	15:35-16:00
<i>Stability of Discrete-Time Switched Positive Linear Systems With Mode-Dependent Average Dwell Time</i>	
Li-Juan Liu	Dalian University of Technology
Xudong Zhao	Dalian University of Technology
Xi-Ming Sun	Dalian University of Technology

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► SaB04-5	16:00-16:25
<i>Positive <math>L_1</math> Controller Design for Positive Piecewise Homogeneous Markovian Jump Systems</i>	
Di Zhang	Northeastern University
Qingling Zhang	Northeastern University

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► SaB04-6	16:25-16:50
<i>Stability Analysis of a Class of Switched Nonlinear Systems With Delays: A Trajectory-Based Comparison Method</i>	
Xingwen Liu	Southwest Minzu University

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## Sunday, August 26, 2018

<b>PL2</b> Plenary Lecture 2	08:30-09:30	Room 205
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Chair: Xingwen Liu

➤ PL-2	08:30-09:30	08:30-09:30
Daizhan Cheng		Chinese Academy of Sciences
<i>Semi-Tensor Product of Matrices and Its Applications</i>		

<b>PL3</b> Plenary Lecture 3	09:30-10:30	Room 205
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Chair: Xudong Zhao

➤ PL-3	09:30-10:30	09:30-10:30
Yoshio Ebihara		Kyoto University
<i>Control Synthesis Under Positivity Constraint: Beautiful Results and Challenging Issues</i>		

<b>Tea break</b>	10:30-10:50	
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<b>SuA01</b> Session 1: Positive Systems Theory	10:50-11:40	Room 205
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Chair: Yuangong Sun

Co-Chair: Zhenhua Wang

➤ SuA01-1		10:50-11:15
<i>A New Interval Observer Design Method With Application to Fault Detection</i>		
Liliang Li	Shanghai Institute of Spaceflight Control Technology	
Zhijie Shao	Shanghai Institute of Spaceflight Control Technology	
Rui Niu	Shanghai Institute of Spaceflight Control Technology	
Gang Liu	Shanghai Institute of Spaceflight Control Technology	
Zhenhua Wang	Harbin Institute of Technology	

➤ SuA01-2		11:15-11:40
<i>State Bounding for Switched Homogeneous Positive Nonlinear Systems</i>		
Yuangong Sun		University of Jinan

<b>SuA02</b> Session 2: Positive Systems and Applications	10:50-11:40	Room 207
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Chair: Jie Lian

Co-Chair: Huijiao Wang

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► SuA02-1 10:50-11:15  
*Event-Triggered  $H_\infty$  Consensus of Nonlinear Multi-Agent Systems With Markovian Switching Topologies*  
 Huijiao Wang Hangzhou Dianzi University  
 Ruihua Dong Hangzhou Dianzi University

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► SuA02-2 11:15-11:40  
*Novel Approaches to Stability and Stabilization of Positive Switched Systems With Unstable Subsystems*  
 Yue Wang Dalian University of Technology  
 Hongwei Wang Dalian University of Technology  
 Jie Lian Dalian University of Technology

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<b>SuB03</b>	13:30-16:20	Room 205
Session 3: Complex Networks Theory		

Chair: Hiroshi Ito  
 Co-Chair: Shuping He

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► SuB03-1 13:30-13:55  
*Pinning Control Design for Stabilization of Boolean Networks From Constructed Boolean Control Networks*  
 Rongjian Liu Southeast University  
 Jianquan Lu Southeast University  
 Jie Zhong City University of Hong Kong

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► SuB03-2 13:55-14:20  
*A Left Eigenvector Producing a Smooth Lyapunov Function of ISS Networks*  
 Hiroshi Ito Kyushu Institute of Technology  
 Bjoern S. Rueffer The University of Newcastle

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► SuB03-3 14:20-14:45  
*Stability and Stabilization of Boolean Networks With Markovian Jump Parameters*  
 Min Meng Nanyang Technological University  
 Jun-E Feng Shandong University

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► SuB03-4 15:05-15:30  
*A New Energy-Efficient Flooding Broadcast Time Synchronization for Wireless Sensor Networks*  
 Tengfei Xia Anhui University  
 Shuping He Anhui University

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► SuB03-5 15:30-15:55  
*Improved Multiple-State Observer Design for Boolean Control Networks*  
 Junqi Yang Henan Polytechnic University  
 Lizhi Cui Henan Polytechnic University  
 Yantao Chen Henan Polytechnic University  
 Zihan Gao Henan Polytechnic University  
 Wei Qian Henan Polytechnic University

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► SuB03-6	15:55-16:20	
<i>Integral Sliding Mode Control for Networked Control Systems</i>		
Jianjun Bai		Hangzhou Dianzi University
<b>SuB04</b>	13:30-16:20	Room 207
Session 4: Complex Systems and Applications		
Chair: Junlin Xiong		
Co-Chair: Weifeng Liu		
► SuB04-1	13:30-13:55	
<i>Control of Wild Mosquito Populations by Incorporating Pulse Release of Genetically Modified Mosquitoes</i>		
Chengjun Sun		Kunming University of Science and Technology
Gabriela Gomes		Liverpool School of Tropical Medicine
Wei Yang		Fudan University
► SuB04-2	13:55-14:20	
<i>Adaptive Output Feedback Control of Uncertain Cascade Nonlinear Systems</i>		
Xianglei Jia		Hangzhou Dianzi University
Shanen Yu		Hangzhou Dianzi University
Shizhou Fu		Hangzhou Dianzi University
► SuB04-3	14:20-14:45	
<i>Extension of Lossless Negative Imaginary Lemmas to Systems With Poles at the Origin</i>		
Junlin Xiong		University of Science and Technology of China
Yongge Guo		University of Science and Technology of China
► SuB04-4	15:05-15:30	
<i>SDA-RVM Based Approach for Surge Fault Detection and Diagnosis During Aero-Engine Take-off Process</i>		
Ji-Bang Li		Dalian University of Technology
Shuo Zhang		Dalian University of Technology
Xiao-Yu Sun		Dalian University of Technology
Wei-Guo Xia		Dalian University of Technology
► SuB04-5	15:30-15:55	
<i>Tracking Control of Single Spin-1/2 Quantum Ensembles</i>		
Shizhou Fu		Hangzhou Dianzi University
► SuB04-6	15:55-16:20	
<i>A Research on Resolvable Coefficient for Group Targets</i>		
Weifeng Liu		Hangzhou Dianzi University

## Monday, August 27, 2018

<b>MoA01</b>	08:30-10:10	Room 205
Session 1: Positive Systems and Applications		

Chair: Xiaoping Lai  
Co-Chair: Liguozhang

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▶MoA01-1	08:30-08:55	
<i>Travel Behavior Analysis for Free-Floating Bike Sharing Systems Based on Markov-chain Models</i>		
Wenjia Liang		Beijing University of Technology
Jianru Hao		Beijing University of Technology
Liguozhang		Beijing University of Technology

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▶MoA01-2	08:55-09:20	
<i>Asynchronous Control for Positive Discrete-Time Markovian Jump Systems</i>		
Hui Shang		Qufu Normal University
Wenhai Qi		Qufu Normal University
Guangdeng Zong		Qufu Normal University

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▶MoA01-3	09:20-09:45	
<i>Magnitude Response Design of Evidence Filters Using the Iterative Constrained Elliptic Error Method</i>		
Xiaoping Lai		Hangzhou Dianzi University

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▶MoA01-4	09:45-10:10	
<i>S-Procedure for Positive Switched Linear Systems and Its Equivalence to Lyapunov-Metzler Inequalities</i>		
Junfeng Zhang		Hangzhou Dianzi University
Tarek Raissi		Conservatoire National des Arts et Metiers

<b>Tea break</b>	10:10-10:30	
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<b>MoA02</b>	10:30-11:45	Room 205
Session 2: Stochastic Positive Systems		

Chair: Jinling Liang  
Co-Chair: Shuqian Zhu

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▶MoA02-1	10:30-10:55	
<i>Positivity and Stability of Continuous-Time Stochastic Linear Systems</i>		
Jinling Liang		Southeast University
Ying Jin		Southeast University



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►MoA02-2	10:55-11:20
<i>Stochastic Stability and Performance of Positive Markov Jump Linear Systems With Time-Delay</i>	
Shuqian Zhu	Shandong University
Qing-Long Han	Shandong University
Chenghui Zhang	Shandong University

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►MoA02-3	11:20-11:45
<i>Non-Fragile Control for Positive Markov Jump Systems With Actuator Saturation</i>	
Shicheng Li	Hangzhou Dianzi University
Junfeng Zhang	Hangzhou Dianzi University
Yun Chen	Hangzhou Dianzi University

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