

Technical Committee on System Identification and Adaptive Control Report

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Summary

The committee met from 12:00 pm to 1:30 pm on December 16th, 2015, at the Osaka International Convention Center in room Ume as part of the activities of the 2015 CDC. 12 members of the TC have attended this meeting. Our next TC meeting is scheduled during the next ACC (Boston Marriott Copley Place) on July 7th at 15h30 in room MIT.

Since CDC2015, we have

- a new chair (Guillaume Mercère) of the TC from January 1st 2016,
- updated the list of TC members,
- started to work with TC members on an IEEE TCST special issue.

Membership

The TC actively encourages new membership, and makes all its meetings open to promote recruitment and participation.

In order to get an up-to-date TC member list, a Google form survey (<http://goo.gl/forms/PP8mZ4Jr4c>) was sent last February to the TC members registered until December 2015. 57 members have replied to this survey. Thus, there are now 57 members in the TC (mainly from academia). This list of members includes 5 IEEE Fellows and 10 IEEE Senior Members. 15 TC members are members of an IEEE CEB. 16 TC members are members of an IEEE JEB. Most of the TC members come from Europe and North America. We must now

- find a way to become more attractive for researchers within Asia & South America,
- try to understand why more than 30 members did not reply to the survey. This will be done by personal emails to former members.

Notice also that we have now a mailing list (tcsiacc@ieeccss.org) to send messages to the list of TC-SIAC members.

Awards and Recognition

Tom Oomen: 2015 IEEE Transactions on Control Systems Technology Outstanding Paper Award for the paper "Connecting system identification and robust control for next-generation motion control of a wafer stage", by Tom Oomen, Robbert van Herpen, Sander Quist, Marc van de Wal, Okko Bosgra, and Maarten Steinbuch, IEEE Transactions on Control Systems Technology, 22(1): 102-118, 2014

Thomas Schön: Arnberg prize 2016 (Arnbergsska priset) by the Royal Swedish Academy of Sciences (KVA). For excellent work in technical science, "for significant contributions to nonlinear identification and particle filtering"

Girish Chowdhary: Air Force Young Investigator Award grant in 2015

Girish Chowdhary: Dave Ward Memorial award by Aerospace Controls and Guidance Committee in 2015

Michel Verhaegen (TU Delft): ERC Advanced Grants awarded for a project entitled “image resolution and quantum materials”. Started in 2013

Paul M. J. van den Hof (TU Eindhoven): ERC Advanced Research grant awarded for a project entitled “Data-driven modeling in dynamic networks” starting in 2016

Invited Sessions

Completed activities

Conference: SYSID2015

Invited session

Topic: “Nonlinear System Identification and State Estimation using Sequential Monte Carlo”

Organizers: Thomas Schön (Uppsala University, *TC-SIAC member*), Fredrik Lindsten (University of Cambridge) and Bhushan Gopaluni (University of British Columbia)

Invited session

Topic: “Stochastic Wiener Systems Identification”

Organizers: Fouad Giri (Université de Caen, *former TC-SIAC member*), Johan Schoukens (Vrije Universiteit Brussel) and David Westwick (University of Calgary)

Invited session

“Block-Oriented Nonlinear System Identification”

Organizers: Fouad Giri (Université de Caen, *former TC-SIAC member*), Johan Schoukens (Vrije Universiteit Brussel) and David Westwick (University of Calgary)

Upcoming activities

Conference: International Conference on Automation, Quality and Testing, Robotics 2016

Invited session

Topic: "Fractional Order Modelling and Control"

Organizers: Clara Ionescu (Ghent University, *TC-SIAC member*) and Cristina Muresan (Technical University of Cluj Napoca)

Conference: ACC2016

Invited session

Topic “High precision systems: modelling and disturbance compensation”

Organizers: Marcel Heertjes (TU Eindhoven), Andrew J. Fleming (University of Newcastle), Tom Oomen (TU Eindhoven, *TC-SIAC member*)

Invited session

Topic “New Directions in Iterative Learning Control”

Organizers: David Hoelzle (University of Notre Dame), Kira Barton (University of Michigan), Tom Oomen (TU Eindhoven, *TC-SIAC member*), Douglas A. Bristow

(Missouri University of Science & Technology), Sandipan Mishra (Rensselaer Polytechnic Institute)

Invited session

Topic “Developments in Identification and Estimation of Linear Parameter-Varying Systems”

Organizers: Javad Mohammadpour (University of Georgia), Roland Toth (Eindhoven University of Technology, *TC-SIAC member*), Nasder Meskin, (Qatar University)

Conference: CDC 2016

Invited session

Topic “System Identification and Control in Cancer”

Organizers: Vanessa Jonsson (California Institute of Technology) and Claire Tomlin (Berkeley University)

Invited session

Topic “Dynamic Network Identification”

Organizers: Arne Dankers (University of Calgary) and Paul M. J. van den Hof (TU Eindhoven, *TC-SIAC member*)

Special Issues

Special Issue in International Journal of Control

"Applied Fractional Calculus in Modeling, Analysis and Design of Control Systems"

Editor-in-chief: Eric Rogers (University of Southampton)

Guest Editors: Yang Quan Chen (University of California), Clara Ionescu (Ghent University, *TC-SIAC member*)

Paper submission finalized. Publication expected: end of this year or beginning of next year.

Special Issue in International Journal of Control

"Identification and Control of Nonlinear Electro-Mechanical Systems"

Editor-in-chief: Eric Rogers (University of Southampton)

Guest Editors: Alexandre Janot (ONERA), Hugues Garnier (Université de Lorraine, *TC-SIAC member*), Peter Young (Lancaster University), Françoise Lamnabhi-Lagarrigue (Centrale Supélec)

<http://explore.tandfonline.com/cfp/est/identification-and-control-of-nonlinear-electro-mechanical-systems>

Papers under review. Publication expected: end of this year or beginning of next year.

Conferences and Workshops

Completed activities

Conference: SYSID2015

Demonstration session

Topic: “Software for system identification”

Organizers: Hugues Garnier (Université de Lorraine, *TC-SIAC member*) and Lennart Ljung (Linköping University, *TC-SIAC member*)

Upcoming workshops

Conference: ACC2016

Workshop

Topic “Identification of Linear, Parameter Varying, and Nonlinear Systems: Theory, Computation, and Applications”

Organizers: Wallace E. Larimore (*Adaptics, Inc*), Pepijn B. Cox (*Eindhoven University of Technology*), Roland Toth (*Eindhoven University of Technology, TC-SIAC member*)

Conference: CDC 2016

Workshop

Topic “Realization theory and its role in system identification”

Organizers: Mihaly Petreczky (*Université de Lille, TC-SIAC member*), Anders Lindquist (*Royal Institute of Technology*), Jan H. van Schuppen (*TU Delft*), Bernard Hanzon (*University College Cork*), Alessandro Chiuso (*University of Padova, TC-SIAC member*), Jana Nemcova (*Institute of Chemical Technology*)

Wikipedia

The task is performed by a working group composed by the TC members Diego Regruto, Girish Chowdhary and Tansel Yucelen. These TC members examine the current Wikipedia pages related to the topic of the TC-SIAC and suggest possible improvements. The first report of the working group has been presented during the TC-SIAC meeting at the 52nd CDC in Florence. A meeting with Jakob Stoustrup is scheduled during ACC 2016 to get new guidelines as far as this project is concerned.

TC Webpage

The updated web-page is available here

<http://system-identification.ieeecss.org/>

We currently try to improve/update the *System identification and adaptive control educational depository* (available by June 1). An initial version of the site is operational:

<http://csel.asu.edu/ieeetc/educational>

We continue to make calls among our members for materials (*e.g.*, syllabi, notes, software) in support of this effort.

Special Issues

The TC-SIAC, in collaboration with the TC on Healthcare and Medical Systems and the TC on System Biology starts to work on a proposal for a Special Issue for IEEE Transactions on Control Systems Technology entitled “Control and Data-driven Modeling in Biomedecine”. The proposal should be submitted to the IEEE TCST Editor in Chief Thomas Parisini by the end of May 2016. A first discussion with Thomas Parisini will be scheduled during ACC 2016.

Other Activities

Working group on LPV identification benchmark.

the task of this working group is to prepare a proposal for an LPV identification benchmark problem with a session dedicated to the comparison of the different

approaches for one of the most important conference on system identification/control. The Working group is led by Roland Toth and composed by TC members Diego Regruto and Guillaume Mercère. This activity, started two years ago, is still active but encounters many practical difficulties. Indeed, the system initially selected for this benchmark session is far from being easy to identify and, for different practical reasons, does not play its role of benchmark because, right now very few tested techniques are able to give satisfactory results. The TC members in charge of this working group are currently studying new system solution for this benchmark proposal. A decision should be made during the next ACC in Boston.