IEEE CSS Technical Committee on Hybrid Systems

Virtual TC Meeting at the 60th IEEE conference on Decision and Control

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Agenda

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  - CEB Nominations
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Introduction

- The Technical Committee on Hybrid Systems is dedicated to provide informational forums, meetings for technical discussion, and information over the web to researchers in the IEEE CSS who are interested in the field of hybrid systems and its applications

- Members: 105 active members (68 members at ACC 2018)
  - Academia: 95 members
  - Industry: 10 members

Introduction

- TC Co-chairs:

TC Website Co-Chair

Jana Tumova
KTH Royal Institute of Technology

TC Wikipage Co-Chair

Sadegh Soudjani
Newcastle University

TC Toolboxes Co-Chair

Manuel Mazo Jr
Delft University of Technology

Introduction

- New TC Webpage

  http://ieeecss.org/tc/hybrid-systems

  Updated regularly with new members, tools, and reports

- TC Google group

  HybridSystemsTC@googlegroups.com

  Members encouraged to email announcements

TC Activities: CSM article

- Every year and a half, the TC is required to write an article for the IEEE Control Systems Magazine (CSM) summarizing the work done during the year;

  (We just submitted one in this September)

- Sample activities:
  - Organization of invited sessions at conferences
  - Organization of workshops, tutorials, and conferences
  - Special issues in journals
  - Service to the field, such as Editor/AE of journals, active role in professional societies, etc.
  - Outreach activities

TC Activities: CEB Nominations

- Around 30 new appointees every year
- Each TC recommends one person for the next batch of CEB recommendations
- Nomination: Very simple 1-page bio-sketch (template provided by CSS)
- Deadline usually in January

TC Student Award

1. *Concept and rationale:*
   - Each award is given at the CDC of year N+1 to a student who is the main author of a paper presented at the CDC of year N and is also a member of the TC
   - Each TC has its own award (or jointly with another TC) whose title includes the name of the TC (or both TC), e.g., named “Hybrid Systems-Discrete Event Systems TC Outstanding Student Paper Award”
   - These awards fulfills two objectives:
     - Recognize young talent associated with a technical area
     - Promote student membership and participation in the TCs
   - The award is presented at the TC meeting at the CDC
2. *Who qualifies*:
   - The main student awardee must be a TC member (IEEE student members?)

TC Student Award

3. *Nomination*: The goal is to have a minimalist nomination process
   - All papers mainly authored by students that belong to the TC are eligible for the award.
   - When a student belongs to multiple TCs, the VPTA decides which TC should consider the paper, in consultation with the TC chairs.
   - Any TC member can nominate a paper through an email to the TC chair. The email needs to contain a statement that the primary author of the paper was a student at the time of paper submission.
   - Self-nominations are allowed, but the nomination email must be carbon-copied to all the authors.

5. *Selection Process*:
   - The selection committee consists of 4-5 person selected by TC chair in consultation with CSS awards chair and/or the VPTA.
   - The selection process is mostly managed by TC chair, who makes a recommendation to the general conference chair.

TC Student Award 2021

1. In total, we received 12 nominations (3 from Discrete Event Systems TC and 9 from Hybrid Systems TC)
2. Committee members:
    1. Kai Cai (Discrete Event Systems TC chair)
    2. Antoine Girard (Neutral member)
    3. Stephane Lafortune (Discrete Event Systems TC member)
    4. Ricardo Sanfelice (Hybrid Systems TC member)
    5. Majid Zamani (Hybrid Systems TC chair)
3. Two stage selection process:
    I. Each committee member reads all 12 papers, and independently rates the following three aspects of each paper with scores from 1 to 5 (low to high). These 3 aspects are essentially from the “Basis for Judging” for the CDC best student paper award i) Originality; ii) Clarity; and iii) Potential impact on practical applications or theoretical foundations of HS and/or DES
    II. We calculate the average scores for all papers (equal weight of the above 3 aspects, and equal weight of the five committee members). We then selected the top three. Finally, five members vote to select the winner (majority rule).

TC Student Award 2021 (Top three papers)

Matthew Abate and Samuel Coogan.

"*Computing Robustly Forward Invariant Sets for Mixed-Monotone Systems*"

Liren Yang and Necmiye Ozay.

"*Efficient Safety Control Synthesis with Imperfect State Information*"

Sophie Gruenbacher, Jacek Cyranka, Mathias Lechner, Md Ariful Islam, Scott Smolka and Radu Grosu.

"*Lagrangian Reachtubes: The Next Generation*"

TC Student Award 2021 (The winner)

Sophie Gruenbacher, Jacek Cyranka, Mathias Lechner, Md Ariful Islam, Scott Smolka and Radu Grosu.

"***Lagrangian Reachtubes: The Next Generation***"

Nomination deadline for the TC Student Award 2022: **February 28, 2022**

TC Activities: Tools for hybrid systems

http://ieeecss.org/tc/hybrid-systems/tools

Workshop on “Computation-Aware Algorithmic Design for Cyber-Physical Systems”

(A collocated workshop of the 2022 CPS-IoT week)

Organizers: Murat Arcak, Abhishek Halder, Heiner Litz, Linh Phan, Ricardo Sanfelice, and Majid Zamani.

The scope of the workshop includes, but is not restricted to, the following topics:

- Quantitative and qualitative analysis of hybrid systems
- Computation-aware models of cyber-physical systems
- Numerical optimization methods
- Hybrid systems verification
- Computation-aware synthesis of hybrid systems
- Reachability analysis of unified hardware-software models
- Automated synthesis of controllers
- Real-time optimization and adaptive Control
- Workload characterization of CPS applications
- Performance measurement and monitoring of CPS applications
- Hardware and software systems for improving the performance of CPS applications

Workshop on “Computation-Aware Algorithmic Design for Cyber-Physical Systems”

Soliciting regular papers (max 6 pages) and extended abstracts (max 2 pages) in IEEE format.

All accepted papers will be appeared in the IEEE.

Tentative submission deadlines: Early February (TBA)

L-CSS Special Issue on “Fragility and Resiliency in Cyber-Physical Discrete Event Systems”

Guest Editors:

- **Christoforos N. Hadjicostis**, University of Cyprus, Cyprus
- **Stéphane Lafortune**, University of Michigan, USA
- **Carla Seatzu**, University of Cagliari, Italy

Submission deadline: January 20, 2022