Hybrid Systems

Chair: Ricardo Sanfelice

Summary

The focus of the IEEE Control Systems Society Hybrid Systems Technical Committee is to promote research and education on hybrid systems. The TC is dedicated to providing 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. The main events dedicated to Hybrid Systems are the Hybrid Systems: Computation and Control Conference (HSCC), which is part of the Cyber-Physical Systems Week, sponsored by IEEE, and the Analysis and Design of Hybrid Systems Conference (ADHS), which is organized by IFAC. The TC on Hybrid Systems has currently 57 members. Since January 1 of 2016, the TC chair is Ricardo Sanfelice (UC Santa Cruz) and the TC co-chair is Alessandro Abate (University of Oxford). A TC meeting was held at the American Control Conference (ACC) in Boston. Another TC meeting is scheduled at the IEEE Conference on Decision and Control (CDC) in Las Vegas.

Details of Meetings

Since the last report on November 2016, the TC on Hybrid Systems met at the IEEE Conference on Decision and Control in Las Vegas. The meeting was very well attended, with 17 members in attendance, plus the TC chair. During the meeting, the TC members discussed the recent first newsletter for the TC, dated October 2016, which was determined as an efficient method to distribute and document information of interest to the TC members, such as announcements, events, etc. The first issue of the TC newsletter is available at the following URL in the TC website: http://hybrid-systems.ieeecss.org/tc-hybrid/newsletter . The members also discussed an initial draft of the table of contents for the upcoming wikipedia entry on hybrid systems at wikipedia.org. In addition, the members layout an initial plan for a workshop attended by most members of the TC on hybrid systems at a research facility. Topics of interest were discussed and a working subgroup to write the proposal for the workshop was formed. The TC members also discussed the idea of adding the term "Cyber-physical Systems" to the name of the TC, which would result in "IEEE TC on Hybrid and Cyber-physical Systems." The next TC meeting will be at the ACC 2017 in Seattle.

Membership (enter number of TC members and any other relevant membership information)

The Hybrid Systems TC has currently 65 members. Currently, of the 65 active members, 62 are from academia and 3 from industry.

Awards and Recognition (provide a list of any awards/recognitions, *since last report*, for the TC and/or it's members - for TC-related activities only)

None since last report.

Activities (provide a list of relevant activities. If no activities, please write *none since last report.*)

Members of the TC are currently working on the following activities:

1. Second TC newsletter with TC-relevant information. The plan is to send the second issue after the TC meeting at the ACC. The first issue of the newsletter is available at http://hybrid-systems.ieeecss.org/tc-hybrid/newsletter .
2. Update of hybrid systems entry at wikipedia.org. The plan is to implement the first set of changes during Summer 2017.
3. Organization of a research workshop at a research facility. A subgroup of TC members have been working on a workshop proposal to Dagstuhl in Germany.

Invited Sessions

The TC is part of the organization of invited sessions and workshops at conferences annually. During 2016, members of the TC organized invited sessions at the American Control Conference, the NOLCOS, and the CDC. In particular, during the NOLCOS the invited session "Recent Advances in Stability and Control of Hybrid Systems" featured presentations by many of the TC members and allowed for fruitful interactions with members of the IFAC TC 1.3 Discrete Event and Hybrid Systems. An invited session entitled "Variational Analysis in Dynamics and Control" was offered during the IEEE CDC in December 2016. Invited sessions at the CDC2017: Event-Triggered and Self-Triggered Control (Session I and II) organized by Heemels, W.P.M.H., Hirche, Sandra, and Johansson, Karl H.

Journal Special Issues (*since last report)*

There are no special issues in journals to report. A column of the work by the TC on hybrid systems was published in IEEE CSM this past April, 2017.

Material Added to **TC Webpage** (*since last report)*

The list of members as of November 2016 was updated. The events and report documents sections were updated as of May 2017.

Wikipedia

Lead by co-chair Alessandro Abate, the TC is working on updating the information in the hybrid systems entry hosted by Wikipedia.org at

https://en.wikipedia.org/wiki/Hybrid_system

This particular entry will be expanded to provide a much more complete summary of the hybrid systems literature, one that not only provides an introduction to newcomers to the field but also serves as a useful resource to researchers. The initial efforts of this activity will be reported at the TC meeting during the CDC 2016.

Other Activities

The TC meets annually at IEEE sponsored conferences. Since last report, the TC meeting took place during the IEEE Conference on Decision and Control in Las Vegas. The meeting brought together previous and new TC members for the discussion of potential activities that the TC could organize in the near future. The discussions during this meeting included logistics, special issues in journals, and a workshop sponsored by the TC.

The IEEE CSS TC on Hybrid Systems collaborates closely with its corresponding IFAC Technical Committee 1.3 Discrete Event and Hybrid Systems in organizing joint discussions during yearly IEEE and IFAC conferences.