

Minutes of IFAC TC 2.4 Optimal Control Meeting

13 October 2022, Online

Chair: Eric Kerrigan (EK)

1. Welcome

EK welcomed everybody. All current TC members were invited. Approximately 35 people attended.

2. What does a TC do?

EK reminded everybody what a TC does and highlighted the following:

- Fostering cooperation and communication among specialists within their particular field of interest
- Planning and monitoring IFAC Technical Events (Symposiums, Conferences, and Workshops) with the NMOs acting as hosts
- Promoting their respective technical areas in other ways, e.g. establishing contacts with other International Organizations, publishing reports on selected topics
- Promoting interest in emerging control fields
- Education
- Engagement between Academia to Industry
- Build some presence on the www and/or on social media
- Acting as Associate Editors, IPC members and reviewers for IFAC events and the World Congress.

3. Scope of TC

EK mentioned that the scope of the TC has, since the World Congress, been revised to the following:

“The development and application of theory and methods for solving optimal control and planning problems, the development of numerical optimization methods, as well as the closed-loop implementation of optimal controllers on real-time computer systems and networked architectures. Particular methods include, but are not limited to, the calculus of variations, Pontryagin's maximum principle, dynamic programming, model predictive control, optimization-based estimation, and differential games. Control methodologies can be based on first-principles models, data-driven models or a combination of both.”

It was proposed by TC members that “reinforcement learning” should probably be in the scope, but care should be taken so as not for this to conflict with any other TCs on intelligent control. After some off-line discussions between EK, Fernando Fontes and Sergio Lucia, it was agreed that the scope be revised to:

“The development and application of theory and methods for solving optimal control and planning problems, the development of numerical optimization methods, as well as the closed-loop implementation of optimal controllers on real-time computer systems and networked architectures. Particular methods include, but are not limited to, the calculus of variations, Pontryagin's maximum principle, dynamic programming, model predictive control, reinforcement learning, optimization-based estimation, and differential games. Control methodologies can be based on first-principles models, data-driven models or a combination of both.”

All TC members are to consider the scope and send suggestions to EK.

4. Membership

EK announced that there are currently 72 TC members and that the Vice Chairs are:

- Stefano Di Cairano (US) - Vice Chair for Industry
- Paul Goulart (UK) - Vice Chair for Publication

- Gabriele Pannocchia (IT) - Vice Chair for Education
- Sergio Lucia (DE) - Vice Chair for Social Media
- Stefan Pickl (DE)
- Alexander Tarasyev (RU)
- Anatolii Kleimenov (RU)

The member list and contact details for Chairs and Vice-chairs can be found on the TC website: <https://tc.ifac-control.org/2/4>

It was also noted that EK's tenure as chair would end in July 2023 and that new chair would be needed for the 2023-2026 triennium. Nominations were invited.

5. Events

It was noted that TC 2.4 is the main sponsor of the following events:

- Conference on Nonlinear Model Predictive Control:
 - 2021: Bratislava, Slovakia, 11-14 July 2021. nmpc2021.org
 - 2024: Kyoto, Japan. subject to official approval
- Workshop on Control Applications of Optimization (CAO):
 - 2022 Gif sur Yvette, France, 18-22 July. <https://cao2022.sciencesconf.org>
 - 2025 Krakow, Poland, subject to official approval.
 - 2028 München, Germany, subject to official approval.

Sorin Olaru reported that CAO 2022 had been a success. They had 98 submitted contributions, of which 72 published in the proceedings. They had 100 registered participants and 80% of them were in person.

It was also reported that the Virtual Seminar Series on Optimal Control, organised by Thulasi Mylvaganam and Timm Faulwasser, was ongoing. They reported that these seminars were attracting a good number of speakers, with the largest proportion of attendance being offline via the YouTube. They had already held four seminars and another was planned for Jan/Feb 2023 on optimisation-based control. The organisers invited suggestions for future seminars.

6. Report from Industry Vice Chair

Stefano Di Cairano (SDC) commented that his main role is as liaison between the TC and the recently established IFAC Industry Committee. The committee is currently looking for participants, including academics who collaborate with industry. Interested TC members are encouraged to contact SDC for further information.

He reported the following updates from the IFAC Industry Committee:

- Several round tables and activities related to industry engagement are being organised for the IFAC World Congress 2023 (Yokohama)
- Industry practitioners and PhD Thesis Awards proposal has been submitted to the TAB.
- Books on Future Impact on Control being written.
- Online seminar series (if any speaker proposals, please send to SDC)

Other potential activities include:

- List/Webpage of tools/repositories for control design (with brief description)
- Share success stories of deployments in Industry (full products)

8. Report from Education Vice Chair

EK reported on behalf of Gabriele Pannocchia (GP) that his role is to:

- Promote educational activities related to the scope of TC2.4, including:
 - Pre-conference workshops
 - Short-courses
 - Primary/Middle/High school reach out activities

- Gather and report such activities
- Connect with other TC's Vice Chairs in a so-called TC Liaisons to Education

He also reported the new proposed structure for IFAC Education Activities.

He reported that early this year, TC 2.4 endorsed The Chinese MPC School 2022, organized by the Beijing Institute of Technology (through announcement in website and social medias). It would be desirable that IFAC TCs could grant proper scientific sponsoring to educational activities (including the use of IFAC logo), but this is not possible at the moment and is a work in progress.

Finally, he asked all TC members to:

- Fill in the following form to report any relevant activity of the last three years (years 2019-2021): <https://forms.office.com/r/BZhJkDbyDX>
- Volunteer for a task force
- Discuss possible activities

9. Report from Social Media Vice Chair

Sergio Lucia (SL) reported some links to general IFAC social media venues:

- Facebook <https://www.facebook.com/IFACcontrol/>
- LinkedIn <https://www.linkedin.com/groups/13400016/>
- Twitter https://twitter.com/IFAC_Control
- YouTube <https://www.youtube.com/channel/UCLcWoqbVNxo9rVSS9NKQDeA>
- IFAC Blog <http://blog.ifac-control.org>

If TC members wished to contribute to these venues, then the following needs to be noted:

- All content needs to be approved by the IFAC secretariat secretariat@ifac-control.org
- To avoid too much duplicate work these venues are planned for the most important announcements:
 - Conferences or workshops
 - A detailed post on a TC event
 - Detailed blog entries on some TC topics

TC 2.4 has the following dedicated social media outlets:

- Twitter [@ifac_tc_24](https://twitter.com/ifac_tc_24) ; https://twitter.com/ifac_tc_24
- LinkedIn <https://www.linkedin.com/groups/9020534/>

SL suggested the following for ideas for contributions:

The main activities on promoting IFAC TC 2.4 events have been:

- IFAC NMPC 2021, preparations of IFAC WC
- IFAC TC 2.4. seminar series (organized by Thulasi Mylvaganam and Timm Faulwasser)
- Like and retweet of related activities
- TC members can send content directly to SL (e.g. related events, workshops, EU-projects, etc.)
- Mention the TC in your tweets and TC-related content will be retweeted
- Other ideas and interest in contributing could include:
 - Put together a collection of links, e.g. in the TC webpage, with freely available teaching material on the TC topics. This collection could be shared via Twitter/LinkedIn.

The official website for TC 2.4 is <https://tc.ifac-control.org/2/4>

10. Report from Publications Vice Chair

No updates from Paul Goulart (PG) since the last meeting.

There was a reminder from EK that the IFAC World Congress was coming up and that TC members were encouraged to make submission to the WC.

11. Working Groups / Task Forces

It was noted that there was one working group:

- Virtual Seminar Series on Optimization and Optimal Control, organised by Thulasi Mylvaganam and Timm Faulwasser.

EK reminded members of the interest in establishing the following working groups or task forces, based on previous TC meetings and discussions with TC members:

- Setting up discussion boards for TC, e.g. Discord, Slack, other.
- Transitioning of optimal control tools to industry.
- Benchmarking.
- Establishing a workshop/conference on Optimal Control.

Interested TC members who wish to lead or participate in the above were asked to contact EK or any of the VCs if they wish to be involved or start any further activities.