

Reports from IFAC Technical Events

Despite the Covid-19 pandemic many IFAC technical events have been able to proceed, albeit in hybrid or fully virtual mode. In this issue of the *IFAC Newsletter* readers will have the opportunity to learn about some technical events that took place in 2020, albeit in different modes than originally planned.

4th IFAC Workshop on Advanced Maintenance Engineering Services and Technology (AMEST) 10-11 September 2020 Cambridge, United Kingdom

The 4th IFAC Workshop on Advanced Maintenance Engineering Services and Technology (AMEST '20), which took place online from 10-11 September 2020 and based in Cambridge, UK, brought together experts from academia and industry to discuss the latest advances in digital technologies and their impact on reliability, maintenance and asset management. Sponsored by the IFAC TC 5.1, co-sponsored by IFAC TC 5.2, 5.3, and supported by the IFIP WG 5.7, the PHM Society and ESRA, the workshop covered a broad range of research and application topics exploring the role of data-driven maintenance and asset management within the domains of manufacturing and infrastructure. Due to social-distancing rules put in place to respond to the COVID-19 pandemic, the workshop was run online with recorded presentations followed by live Q&A with the presenters.

The workshop programme thematically addressed the research issues in the field of maintenance and asset management in an increasingly digital world as follows:

- Data-driven decision-making was the focus of two sessions, two of which examined emerging knowledge and data management challenges including organizational constraints, issues surround data quality, and the need for a strategic approach to data management. Solutions to address these challenges include the development and use of ontologies and effective combination of data and expert knowledge to deliver improved decision-making.
- Two sessions focussed on modelling techniques and approaches for maintenance planning, which explored new techniques to support the different types of decisions ranging from lot-sizing, intervention planning and equipment replacement in a variety of industrial contexts such as telecommunication networks, critical cranes and cutting tools.
- The popular topic of Artificial Intelligence for predictive maintenance was explored in two sessions, which discussed the comparison of different machine learning techniques, the use of AI-based techniques for fault detection and prediction, change detection and maintenance planning. The sessions highlighted the potential of machine learning techniques such as federated learning, dynamic Bayesian networks, collaborative gaussian process regression and recurrent neural networks.
- Asset and maintenance management in the context of Industry 4.0 was the focus of one session, which explored how I4.0 technologies can be effectively integrated with maintenance processes, and specifically examined the role of digitalised maintenance in the context of the circular economy.
- One session focused on novel industrial monitoring approaches, demonstrating the development of monitoring solutions that are fault-tolerant, capable of producing data of sufficient quality whilst being low cost, thus enhancing the ability of small and medium-sized enterprises to enjoy the benefits of Industry 4.0 and Artificial Intelligence.
- The role of augmented reality in the context of maintenance was the focus of one session which illustrated how such technologies can enable training of personnel, and support assembly operations and calibration of industrial equipment.
- Prognostics and Health Management (PHM) performance enhancement has seen distinct contribution from the increasing availability of data enabled by digital technologies and is the subject of a dedicated session. The session explored novel algorithms, ranging from fuzzy information fusion, ensemble learning and extreme machine learning, specifically for PHM activities, including predicting the remaining useful life of a variety of critical industrial equipment such as hydraulic pumps, aircraft engines, and batteries.
- Digital twins, which aims to digitally replicate the condition and operational status of physical equipment is increasingly a hot topic in aca-

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Engineering Applications of Artificial Intelligence

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Journal of Process Control

<http://www.journals.elsevier.com/journal-of-process-control>

Annual Reviews in Control

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Journal on Mechatronics

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Nonlinear Analysis: Hybrid Systems

<http://www.journals.elsevier.com/nonlinear-analysis-hybrid-systems>

IFAC Journal of Systems & Control

<http://www.journals.elsevier.com/ifac-journal-of-systems-and-control>

IFAC-PapersOnLine

<http://www.journals.elsevier.com/ifac-papersonline>

demia and industry. The design, development and exploitation of digital twins in the context of manufacturing and infrastructure industries formed two sessions at the workshop.

- Two sessions explored versatile predictive maintenance strategies for the industry of the future. In particular, the sessions focussed on H2020 projects from the cluster of Predictive Maintenance projects supported by the European Commission and offered an overview of the cutting-edge research and innovation activities in this area across Europe.

The papers presented at AMEST'20 provided ample evidence for the potential of digital technologies to radically change the way industrial assets are managed throughout their life. The workshop also highlighted the need to keep focussing on the fundamentals of reliability engineering and science whilst exploiting the benefits of digitalisation. It was clear that research in the area of digitalised maintenance is flourishing and continues to provide new and exciting avenues of research. The collection of papers included in the AMEST'20 program is multidisciplinary, bringing together researchers in engineering, mathematics, data science and ICT, and provides an important contribution to the body of knowledge in maintenance and asset management, thus directly addressing the objectives of the IFAC AMEST Working Group.

Submitted by: Ajith Parlikad,
University of Cambridge

22nd European Conference on Power Electronics and Applications (EPE-ECCE) 7-11 September 2020 Lyon, FR

The 22nd European Conference on Power Electronics and Applications took place fully online from 7- 11 September 2020. The conference has been opened by the General Chair, Abdelkrim Benchaib, see <https://www.supergrid-institute.com/en/2020/09/08/this-weeks-high-light-epe20-ecce-europe-conference/>. The EPE ECCE Europe conference is the largest in its field, attracting experts from around the world to take part in the discussions every year. The conference brings together researchers, engineers, and all those working at the forefront of power electronics technologies to exchange and meet fellow professionals and academics. The EPE ECCE Europe conference is one of the best examples of this type of event where the future role of power electronics in this ecological revolution will be explored.

Power electronics are at the heart of energy transition. They constitute critical elements in the drive towards a new greener economic and social model; a model of sustainable development that reinvents our way of consuming, producing, working, and living together to meet the major environmental challenges that we now face. Advanced power electronics

designed to increase energy savings, reduce our carbon footprint and integrate smart digital analysis will boost renewable energy integration, sustainable mobility and energy-efficient buildings.

This year's edition took a very different form as a result of the Covid-19 pandemic but it has been a rich and engaging for the whole power electronics community nonetheless. The organizing committee, which found itself transformed into a Crisis Local Organizing Committee (CLOC) worked a lot to insure a remarkable and memorable conference, in spite of these unprecedented circumstances. Numerous topics have been discussed, not only in the lecture and dialogue (replacing poster) sessions of the conferences but also during the exhibition, industrial forums and tutorials.

Five outstanding keynotes were presented:

- *"Roadmap for DC"*, Pavol Bauer, Delft University of Technology
- *"Thomas Edison vindicated – the resurgence of DC in MV and HV power grids"*, Colin Davidson, Consulting Engineer – HVDC, at GE Grid Solutions HVDC Activity
- *"Integration of Electric Mobility in the French public electricity distribution network"*, Anne-Sophie Cochelein, ENEDIS
- *"A critical role for R&I for clean energy for the EU green and digital recovery"*, Hélène Chrays, European Commission, Head of Unit – Clean Energy Transition
- *"The role of collaborative research to support innovation for clean energy transition"*, Hubert de La Grandière, SuperGrid Institute

Five tutorials took place right before the conference on:

- *Characterization and impact of SiC and GaN on Power Drive Systems*
- *Control of Modular Multilevel Converters for Variable-Voltage Variable-Frequency Applications*
- *Electronic Design Automation and optimization algorithms for the next generation of optimal power converters*
- *Model Predictive Control of Power Electronic Systems*

The IFAC Conference App is now available!

The App is paid for by IFAC and can be used free of charge by IFAC event organizers and attendees. Many IFAC events to be included soon!

How to download:

App Store <http://bit.ly/2ID8v0h>

Google Play <http://bit.ly/2IRT8BZ>

You can also search for 'IFAC' in the Apple App Store or in the Google Play Store.

From the IFAC President



Dear IFAC Friends and Colleagues,

The Covid-19 pandemic brought on adaptations and changes to previously made plans, even plans that had been made years in advance, in all of our personal and professional lives. IFAC activities have also been affected by the pandemic, with adaptations made to many long-standing plans.

Vaccination has started in many countries, but at this time there are still many unknowns. This is a challenging situation for organizers and participants of technical events, many of which were planned and scheduled before the pandemic. Some IFAC technical events have already changed to hybrid or all-virtual formats for 2021, while others have postponed from planned dates in 2021 until 2022. Still there are other events which are waiting to see how the pandemic situation unfolds as 2021 progresses, as travel and in-person events may become more possible as the year progresses. Six events have been postponed to 2022 (MATHMOD, PDES, ROCOND, SAFEPROCESS, CPES, and SYROCO), and currently it is planned that there will be 17 IFAC main-sponsored events in 2021.

The IFAC Events Calendar https://www.ifac-control.org/events/@@events_view on the IFAC webpage is constantly updated as new information becomes available in the Secretariat (events approved, dates changed, etc.) so check back often for the latest status!

Usually the IFAC community would gather yearly in an IFAC NMO country for the IFAC Council and Related Meetings. In 2020 this had to be done remotely, in conjunction with the IFAC World Congress which also had to transition to a virtual event, despite years of planning and preparation for an in-person gathering. For 2021 the IFAC Council voted that the meetings will also be held virtually, as at this time there are too many unknowns for well into 2021 to be able to plan an in-person gathering of international participants. It is hoped that IFAC can return to in-person annual meetings again in 2022.

For the time being: Follow the public health and hygiene protocols for your country/region, wash your hands, look out for your health and well-being, and stay positive that we will be able to gather together in-person again sooner rather than later!

Hajime Asama,
IFAC President 2020-2023

- *Reliability-Oriented Thermal Modelling of Power Electronics Systems.*

We initially planned to organize the conference in Lyon, which is home not only to the headquarters of SuperGrid Institute, this year's event organiser, but also to André Marie Ampère, one of the fathers of Electromagnetism. We missed all the social events in Lyon and among them the celebration of the 200th anniversary of Ampère's laws!

The EPE association will meet you at EPE ECCE 2021 where the Power Electronics community will gather in Ghent, Belgium, from 6- 10 September 2021, to exchange views on research progress and technological developments in the various topics, see <http://www.epe2021.com/>

Submitted by: Abdelkrim Benchaib,
ECCE General Chair

Addressing E-mail Fraud in the IFAC Community

Over the past few years spammers and scammers have unfortunately targeted the IFAC community on several occasions. They have impersonated as IFAC officials and have persisted in taking advantage of the commendable trust and camaraderie that has existed among community members in this international federation ever since its founding. Unfortunately their attempts have proved successful even after a President's Column in 2019 addressing this issue, as well as messages from the IFAC Secretariat to community members via e-mail and on the IFAC website.

In an effort to combat the problem IFAC has recently removed the e-mail addresses of its officials from the list of officials. If you are trying to contact an IFAC official and do not have their e-mail address or cannot find it from another source it is still possible to contact them using this list. The new procedure is that you can now lick on the „e-mail to“ button and the email will be sent to the IFAC Secretariat, who will then forward the message on to the relevant official.

If you receive a message from someone purporting to be an IFAC official (especially with a request that does not feel right), or are unsure if a message came from the IFAC official it claims to be from, or have any questions about any correspondence that references IFAC but does not seem to be legitimate please bring it to the attention of the IFAC Secretariat. Do not reply to such messages, do not click on links within such messages, do not engage with the spammers, and do not provide them with funds, banking info, etc.

Please note that in the various spam attempts the messages were NOT sent from e-mail addresses affiliated with or operated by IFAC and that internal IFAC data/information was NOT compromised!

Announcing the Control Engineering Practice Early Career Advisory Board

Control Engineering Practice, IFAC's applications journal, is published monthly. It contains high-quality papers which illustrate the direct application of control theory and its supporting technologies in all possible areas of automation. Papers demonstrating the contribution of automation and control in improving the performance, quality, productivity, sustainability, resource and energy efficiency, and the manageability of systems and processes for the benefit of mankind and are relevant to industrial practitioners are most welcome. All papers, whether originating from IFAC events or directly submitted, are rigorously reviewed by an international panel of referees.

<https://www.journals.elsevier.com/control-engineering-practice>

Control Engineering Practice (CEP) intends to form an Early Career Advisory Board (ECAB) to recognize outstanding early career researchers and engage them in a path towards editorial work. Early career researchers are defined as those who have completed their doctoral degree and are within five years of their first independent research career in a tenure-track or equivalent position. The responsibilities of ECAB members include:

- Actively conduct reviews for CEP papers at the request of the journal's Editors
- Submit at least two manuscripts to CEP within the term (which will be processed like any other regular submissions)
- Be an ambassador for CEP and promote the journal via social media, conferences, and other channels
- Provide consultation to CEP editors at their request
- Assist with special issue proposal and paper reviews under the guidance and discretion of CEP editors

Demonstrated competence in at least two fields out of the following or some preferred fields is also required:

Fields of applications in control and automation:

- Automotive Systems •Aerospace Applications •Marine Systems •Intelligent Transportation Systems and Traffic Control •Autonomous Vehicles •Robotics •Human Machine Systems •Mechatronic Systems •Scientific Instrumentation •Micro- and Nanosystems •Fluid Power Systems •Gas Turbines and Fluid Machinery •Machine Tools •Manufacturing Technology and Production Engineering •Logistics •Power Electronics •Electrical Drives •Internet of Things •Communication Systems •Power and Energy Systems •Biomedical Engineering and Medical Applications •Biosystems and Bioprocesses •Biotechnology •Chemical Engineering •Pulp and Paper Processing •Mining,

Mineral and Metal Processing •Water/Gas/Oil Reticulation Systems •Environmental Engineering •Agricultural Systems •Food Engineering •Other Emerging Control Applications
Finally, we require evidence of a high-quality publication record.

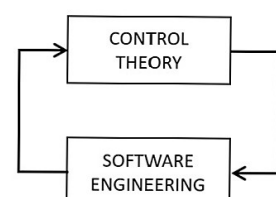
A term for ECAB members is two years, with possible renewal for a second term (if eligibility continues to be met). Exceptional ECAB members will be elevated to *Control Engineering Practice* Editorial Board member status. They will also be promoted and recommended for similar capacities to other relevant Elsevier/IFAC journals. Qualified early career researchers are encouraged to submit an application including name, affiliation (with a link to the applicant's webpage if possible), expertise, reviewing experience and a list of publications, in a single PDF file and via an e-mail to the *Control Engineering Practice* editors at ghan@swin.edu.au.

The application will be accepted between January 1 and March 1 annually. All applications will be reviewed by CEP editors, and applicants will be informed about a decision within four weeks past the deadline. The selected ECAB members' names will be posted on the webpage of the *Control Engineering Practice* Editorial Board.

Submitted by: Kay Tancock,
IFAC Elsevier representative

IFAC Blog Control Systems and Software Engineering: A Time to Merge Two Solitudes

There is no doubt that ours is an increasingly cyber-physical society. That is, we are more and more dependent on complex "smart" systems (cities, houses, vehicles, electricity grids, internet of things, etc.), all of which are used to control our world to make it more amenable to human needs. A salient illustration of this trend is the "Smart Anything Everywhere (SAE)" initiative, which is an integral part of the European Commission's Horizon 2020 advanced research programme. Its objective is to upgrade "products and services to the digital age" (<https://smartanythingeverywhere.eu/>).



The term "cyber-physical" is a relatively new one and is used to denote "an integration of computation and physical processes" [1]. However, this potential for synergy between information technology and physical devices has been obvious from the very earliest days of computing technology. At this point, we

are at a stage where the latest hardware and software systems can provide capabilities that could only be dreamed about when Norbert Wiener introduced the term “cybernetics” over 70 year ago.

At that time, the desire and need for automated control of physical processes led to the new engineering discipline of automatic control. This discipline quickly developed a solid theoretical foundation based on the classical principles of engineering through the use of physical and mathematical modeling. This foundation was further extended to cover the emerging computing technologies with sampled-data approaches.

With the self-evident complementarity of computers and control theory, one would expect that the software engineering and automatic control communities would be highly integrated and working in close collaboration with each other. Unfortunately, after close to five decades of industrial experience in both domains, my sense is that this is not the case. Moreover, there seems to be little interest among many to bring them closer together, particularly among those involved in research (where one would normally expect the collaboration to be most intense).

As a case in point, not too long ago I had an interesting exchange with the project lead of a large “smart grid” research project. This was a major government-funded research initiative with a budget that ran into hundreds of millions of dollars. This particular individual is a highly regarded professor, widely recognized for his world-class research in control theory. I asked him how he saw the role of software in this project. He responded with “oh, you mean the data side” (my emphasis). In other words, his perception of the primary purpose of software was to perform ancillary “data processing” functions, such as accounting, logging, archiving, and the like.

Nor was he alone in this view. It emerged later that all other members of the research team – all of them experienced and highly capable researchers in various classical engineering disciplines (electrical, control engineering, etc.) – shared this distorted opinion. In fact, no individual on the team had extensive experience with or expertise in software engineering. At best, software is perceived as a power-assist augmenting individual “real engineering” components by adding a bit of “smarts” to them.

This skewed perception of software and its role is one that I have encountered a number of times, particularly in the automotive sector. This is a domain where the primary responsibility for the technical design belonged, quite understandably, to mechanical system engineers. However, over time the amount and complexity

of software in modern vehicles grew by orders of magnitude (the software in some modern vehicles exceeds a hundred million lines of code). From initially replacing simple relay-based logic, the software in these systems rapidly became all encompassing. For example, the current AUTOSAR standard for automotive systems [3] was specifically designed to integrate the different software components in a vehicle into a single unified system. This has, unfortunately, created a whole new category of problems stemming from unforeseen couplings between previously independent automotive functions, exacerbating further the already deplorable industry-standard defect rate for large software systems¹. Consequently, software had become a primary source of defects many of them resulting in expensive vehicle recalls. Fortunately, with the recent focus on autonomous vehicles, in this domain software is now increasingly viewed as an integral part of system design at the highest level. However, as my power-grid example suggests, this has yet to be adequately recognized in other domains.

Lest the foregoing might lead to conclusions that the problem lies exclusively with attitudes and culture of classical engineers, it should be clear that the software engineering community is at least equally to blame, if not more. Namely, as the youngest and, in many ways, a unique technical discipline, software has evolved a culture that has little in common with traditional engineering. Its novelty has misled many of its practitioners into thinking that there is nothing particularly relevant to be garnered from classical engineering theory and practice. For example, the concept of agile development, which has been practiced in traditional engineering from prehistory, has been re-invented (as a completely “new” idea²) by software “gurus”, and then further corrupted by its practitioners. Thus, one of the precepts of the “Agile Manifesto” [5], states that there should be “no big up-front design” at the start of a software project, on the assumption that a good design will emerge as the implementation proceeds. (While this approach might work for small-scale software systems, it would definitely lead to catastrophic failures for large systems such as those needed for autonomous vehicles or smart grids.)

Moreover, the lack of contact with and cross-fertilization from disciplines such as control engineering, means that a multitude of software practitioners are unaware of some common engineering design patterns that are highly relevant in their domain. One salient example is the principle of negative feedback. After all, the reasoning goes, software is used for control, so while it may be a part of an automatic control system, this principle does not apply to the software itself. Yet, in my 40-plus year industrial experience, I have seen great value precisely in exploiting feedback control to the control of the software itself, especially for large (and, hence, buggy) software systems³. These systems consist of many different subsystems, whose functionality has to be properly initialized and synchronized. This can be a very complex task that needs to be carefully worked out. Fur-

thermore, because software is so highly error prone, there is a need to quickly detect and recover from failures – whatever their cause. This is precisely the kind of problem that feedback control was designed to solve. It is particularly applicable for the coming generation of large cyber-physical systems, where it is finally being recognized that there is a need to devise designs capable of dealing with uncertainty stemming from the inevitable “unknown unknowns” [7] inherent in such systems.

Similarly, the fundamental control concept of observability is poorly understood in this community, where it is often perceived as a matter of debugging. Yet, given the transhuman speeds at which software executes, it is hard to imagine a more critical category of systems in need of greater observability. For example, it is quite common for software designers to be surprised when – by means of specialized execution profiling facilities – they are presented with information on what their systems are actually doing.

In conclusion, it seems clear to me that it is high time for the theoreticians and practitioners involved in both disciplines, currently operating as “two solitudes”, to come together and learn from each other in what should be a natural synergy. To do otherwise, would be irresponsible.

Author: Bran Selic,
Malina Software Corp., selic@acm.org

1 Estimated at between 15 and 50 bugs per 1000 lines of code [4]

2 In that vein, there is a famous saying by Mark Twain: “The Ancients stole all our good new ideas”.

3 This is a variant of the problem captured in the age-old problem: “Who takes care of the caretaker while the caretaker is busy taking care?”

Editor’s note: The original blog entry, complete with sources/references can be viewed at: <http://blog.ifac-control.org/control/control-systems-and-software-engineering-a-time-to-merge-two-solitudes/>

IFAC Council- and Related Meetings 2021 9-19 July 2021 ONLINE

The 2021 IFAC Council- and Related Meetings will take place online from 9-19 July 2021. This decision was made via e-vote by the IFAC Council in November 2020.

The committee chairs will receive the relevant information and are kindly asked to distribute it to their members.

Further information regarding organizational details, links, meeting dates and times, etc. will be distributed in due course closer to the meeting dates.

IFAC Blog is available at:

<http://blog.ifac-control.org/>

Check out the latest blog posts on relevant and exciting control topics!

IFAC E-mail Addresses Available free of charge for IFAC Affiliates

IFAC e-mail addresses are available for IFAC affiliates. (If you receive this Newsletter via e-mail directly from IFAC you are an IFAC affiliate!) These are not separate email accounts—they are email addresses that send emails to whichever email account that you designate.

If you change employers, educational institutions, etc. your IFAC e-mail address remains the same. You can register for an IFAC email address (with the e-mail you used when you registered as an IFAC affiliate) using the following link

<https://hera.ifac-control.org/ifacmail/>

IFAC does not store your e-mails or have any access to them whatsoever. If you are not sure of the e-mail address you used when you registered as an affiliate or need any assistance please contact the IFAC Secretariat.

IFAC e-mail addresses are provided to IFAC affiliates for no charge.

IFAC 2020 Update Videos Now Available on the IFAC YouTube Channel

We are very happy to inform you that most of the 2020 World Congress plenary, panel sessions and other videos have been published on the IFAC YouTube channel. There is a separate 21st IFAC World Congress, Berlin (Germany) 2020 playlist. Each panel discussion is linked in the last 15-20 seconds of the corresponding session.

Here's the link to the playlist:

https://youtube.com/playlist?list=PLLhem8_dLoap0LyLouvjMTcP7anJqpn1

Special thanks goes to the IFAC 2020 IPC co-chairs, Sandra Hirche and Rolf Findeisen for providing the videos, to Julian Berberich (University of Stuttgart) for the help with gathering the release forms and editing the videos as well as Chantel Lapins (IFAC YouTube editor) for her prompt action and uploading the videos to the IFAC channel.

For further news and updates concerning IFAC 2020 related topics please check the IFAC 2020 webpage: <https://www.ifac2020.org/>

Check out IFAC's YouTube channel for new and historical IFAC video materials!
<https://www.ifac-control.org/>

Readers of this Newsletter are kindly requested to keep their contact details updated with the IFAC Secretariat.

IFAC Girls in Control Additional languages are now available

A new IFAC initiative is the „Girls in Control“ workshop. Originally this workshop was going to be held in person in conjunction with the 2020 IFAC World Congress in Berlin, but due to the pandemic situation the organizers were able to transition it to be held completely online. The workshop is offered free of charge and is targeted to 10-to-15-year-old girls. Its aims are to stimulate their passion for control and encourage them to consider a career in STEM.

During the workshop, the girls watch several videos covering control theoretic principles. They learn about feedback and discuss control examples from their everyday lives. Using the Scratch programming language they can then implement their first controllers for an automatic game of their design.

Running the workshop virtually removed geographical/travel barriers, as the participation could occur from anywhere. However to reach a larger span of girls the new problem became language barriers. Thus, the idea to develop the workshop materials in many languages developed. Through colleagues and connections, control engineers from around the globe were contacted and encouraged to develop the materials in their mother tongue.

The first round of material from July 2020 was available in English, French, German, Italian, Norwegian, Portuguese Additional languages have been added— Bengali, Chinese, Hindi, Indonesian, Japanese, Korean, Romanian, Russian, Spanish, Swedish, Thai, and with plans underway for more (Dutch Persian and Turkish are already in progress. If you are interested in helping to make the materials available in your language please contact the Girls in Control team at gic@ifac-control.org.

The material is 95% the same across all of the various language versions. That means that all written material is simply translated. The videos are such that the video / pictures are the same but the voiceovers are in the different languages. The differences are as follows:

* In the videos, there is an example of a shower. Because the showers in South America are different than those found in many other regions, so that kids in Brazil might not understand the example, this part was substituted by a different example in the Portuguese videos.

* In the Japanese version, some additional slides and explanations were added to explain what control is.

* The Indonesian team didn't have time to record the voiceovers yet, so for now the videos are in English (spoken) with Indonesian subtitles.

* In the instructions on how to use Zoom for the kids, some volunteers redid the screenshots so that it also reads in their language. So there are some slight differences in the materi-

als but they are almost all due to local adaptations that aim at making the material more suitable for the target audience, i.e., the kids from certain regions in the world.

* If you speak a language (native or sufficiently well) that is not yet offered and have a head for outreach and a bit of time to spend on this, please consider getting in contact with us to see if you could contribute to an additional language package.

* If you speak any of the languages that are already offered but you would like to contribute, please feel free to contact us or the people that already volunteered for this language as help is always welcome and there might be many ways to contribute when running the workshop the next time.

* We are thinking of extending the material for a more advanced version of the workshop but this is in very early stages at the moment.

* Due to widespread interest, we will run/offer /organise at least one workshop for colleagues to show them how the GIC workshop is done, explain the organisation, discuss the material and basically teach others how the workshop is done so far, in case they wish to use the material and run a workshop themselves.

For information or to access the Girls in Control material please visit:

<https://ifac-control.org/areas/girls-in-control-gic-workshop-and-material>

Written by Elske Haberl (IFAC Secretariat) with information provided by Steffi Knorn (DE, IFAC Girls in Control)

Who's Who in IFAC

IFAC Council Member: Ravindra D. Gudi

Ravindra D. Gudi is currently the Professor-in-Charge of the IIT Bombay Research Park Foundation. He has served as Head of Department of Chemical Engineering at Indian Institute of Technology, Bombay (IN). He also holds the Institute Chair Position in Artificial Intelligence and Machine Learning. He earned his B-Tech and M-Tech degrees from IIT Bombay and a PhD from the University of Alberta (1995). His research interests lie broadly in process systems engineering & green engineering, i.e. modeling, optimization, control and fault diagnosis of process systems, sustainability in industrial practices.

R. Gudi has served as a Visiting Professor at the Department of Chemical Engineering, University of Alberta, Canada (1997), Department of Chemical Engineering, University of Wisconsin- Madison, US (2003-04). Dr. Gudi has published over 135 scopus indexed papers and has nine US patents to his credit, in various areas of process systems engineering. He has guided over 60 PhD and M.Tech students in their research at IIT Bombay.

R. Gudi is a recipient of several awards including the Canadian Commonwealth Fellowship

by the Government of Canada (1991-1995), Lovraj Kumar Memorial Award for promotion of Industry Academia Interaction, (July 1998 - January 1999) Manudhane Applied Research Award (2006), Herdillia Award for Excellence in Basic Chemical Engineering (2009). He is also an Associate Editor of the IFAC journal of Process Control and Guest Editor for Control Engineering Practice.



R. Gudi serves on several IFAC Technical Committees. He has also been an active consultant to the industry in India and abroad. He is also currently the President of the Automatic Control and Dynamic Optimization Society of India (the Indian IFAC NMO).

IFAC Council Member: Karl H. Johansson

Karl H. Johansson (SE) is Professor with the School of Electrical Engineering and Computer Science at KTH Royal Institute of Technology in Stockholm and Director of the center Digital Futures. He is also Distinguished Professor with the Swedish Research Council and Wallenberg Scholar with the Knut and Alice Wallenberg Foundation. He received MSc and PhD degrees from Lund University under the supervision of Profs. Karl Johan Åström and Anders Rantzer. He has held visiting positions at UC Berkeley, California Institute of Technology, NTU Singapore, Institute of Advanced Studies Hong Kong UST, Norwegian University of Science and Technology and Zhejiang University. He is member of the Scientific Council for Natural and Engineering Sciences within the Swedish Research Council.



K. H. Johansson's research interests are in the fundamentals of networked control systems and cyber-physical systems and their applications in transportation, energy and automation networks. Within these areas he has co-authored more than 700 journal and conference papers and holds five patents. He has advised or co-advised 26 PhD students and 46 post-docs.

His work has been recognized through several awards from IFAC, IEEE and ACM. He has given many invited plenary and keynote presentations, for example, over the last couple of years

at IEEE CCTA (2019), IEEE ICCA (2019), IFAC WCTS (2019), IFAC ROCOND (2018) and ACM MOBIHOC (2018).

He was awarded Future Research Leader from the Swedish Foundation for Strategic Research in 2005. He is Fellow of the IEEE and the Royal Swedish Academy of Engineering Sciences and he is IEEE Distinguished Lecturer.

K. H. Johansson is providing service to the research community. He has served two terms on the IEEE Control Systems Society Board of Governors. He is currently Vice President of the European Control Association. He is past Chair of the IEEE Simon Ramo Medal Committee and current Chair of the IEEE Control Systems Society Fellow Nominations Committee. He has been on the Editorial Boards of IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems and IET Control Theory and Applications and currently serves European Journal of Control, Annual Review of Control, Robotics, and Autonomous Systems and ACM Transactions on the Internet of Things. He was the General Chair of the ACM/IEEE Cyber-Physical Systems Week in Stockholm 2010 and IPC Chair of many conferences.

Within IFAC, K. H. Johansson served as IFAC Awards Committee Chair and member of the IFAC Executive Board from 2017-2020. In the past, he was involved in establishing the IFAC Technical Committee on Networked Systems (together with Prof. Sandro Zampieri and others) and served as its Vice-Chair from 2005-2008 and Chair from 2008-2011. He was PC Co-Chair (together with Prof. Asu Ozdaglar) for the 1st IFAC Workshop NECSYS in Venice 2009. He was Associate Editor for the IFAC Journal *Automatica* from 2003-2006.

IFAC Council Member: Jacquelin M.A. Scherpen

Jacquelin M.A. Scherpen received the M.Sc. and Ph.D. degrees in applied mathematics from the University of Twente, Enschede (NL) in 1990 and 1994, respectively.



She was with Delft University of Technology (NL) from 1994 to 2006. Since September 2006, she has been a Professor with the University of Groningen, at the Engineering and Technology Institute Groningen (ENTEG) of the Faculty of Science and Engineering, Groningen (NL). From 2013- 2019 J. Scherpen was scientific director of ENTEG. She is currently director of the Groningen Engineering Center, and Captain of Science of the Dutch top sector High Tech Systems and Materials. She has held visiting research positions at the University of To-

kyo (JP), Universite de Compiegne, SUPELEC, Gif-sur-Yvette (FR) and the Old Dominion University, Norfolk (VA, USA.)

J. Scherpen's current research interests include model reduction methods for networks, nonlinear model reduction methods, nonlinear control methods, modeling and control of physical systems with applications to electrical circuits, electromechanical systems, mechanical systems, and grid application, and distributed optimal control applications to smart grids.

She has been an Associate Editor of the IEEE Transactions on Automatic Control, the International Journal of Robust and Nonlinear Control (IJRNC), and the IMA Journal of Mathematical Control and Information. She is on the Editorial Board of the IJRNC.

J. Scherpen received the Automatica Best Paper Prize in 2020, and in 2019 she received a royal distinction and is appointed Knight in the Order of the Netherlands Lion. She was vice-chair of the Publications Committee of IFAC from 2017-2020, is a member of the BoG of the IEEE Control Systems Society, chair of the IEEE CSS standing committee on Women in Control, and president of the European Control Association (EUCA). She is a Council member of IFAC for the 2020-2023 triennium.

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Acknowledgement to IFAC would be appreciated.

The IFAC Calendar of Events is constantly updated as additional technical events (Workshops, Symposia, and Conferences) are approved. Due to the Covid-19 pandemic some events have had date changes, cancellations, etc. since their initial approval. Please check back often for the current status. The complete version of the IFAC Calendar of Events is available online at:

<https://www.ifac-control.org/events/>

Calendar of IFAC Events

Title	2021	Place	Further Information
International Conference on Automation, XXV Congreso de la Asociación Chilena de Control Automático - ICA ACCA 2020	March 22 – 26	ONLINE Chile	https://controlautomatico.org/ica_acca2020/
Conference on American Control Conference (in cooperation with IFAC) ACC 2021	May 26 – 28	New Orleans, LA USA	http://acc2021.a2c2.org/
17 th IFAC Symposium on Information Control Problems in Manufacturing INCOM 2021	June 07 – 09	Budapest Hungary	https://incom2021.org/info@incom2021.org
16 th IFAC Symposium on Control in Transportation Systems CTS 2021	June 08 – 10	Lille France	https://cts2021.univ-gustave-eiffel.fr/cts2021@univ-eiffel.fr
11 th IFAC Symposium on Advanced Control of Chemical Processes ADCHEM 2021	June 13 – 16	Venice Italy	https://www.adchem2021.org/noc@adchem2021.org
Conference on European Control Conference (in cooperation with IFAC) ECC 2021	June/July 29 – 02	Rotterdam Netherlands	https://ecc21.euca-ecc.org/
4 th IFAC Conference on Embedded Systems, Computational Intelligence and Telematics in Control CESCIT 2021	July 05 – 07	Valenciennes France	http://www.uphf.fr/cescit2021
7 th IFAC Conference on Analysis and Design of Hybrid Systems ADHS 2021	July 07 – 09	Brussels Belgium	https://sites.uclouvain.be/adhs21/
7 th IFAC Conference on Nonlinear Model Predictive Control NMPC 2021	July 11 – 14	Bratislava Slovakia	https://www.nmpc2021.org/martin.klauco@stuba.sk
19 th IFAC Symposium on System Identification SYSID 2021	July 14 – 16	Padova Italy	https://sysid2021.org/organizingcommittee@sysid2021.org
4 th IFAC Workshop on Linear Parameter Varying Systems LPVS 2021	July 19 – 20	Milan Italy	https://www.lpvs2021.deib.polimi.it/lpvs2021@polimi.it
6 th IFAC Conference on Engine and Powertrain Control, Simulation and Modeling E-COSM 2021	August 23 – 25	Tokyo Japan	http://shenlab.jp/ecosm2021/index.html
24 th International Symposium on Mathematical Theory of Networks and Systems (in cooperation with IFAC) MTNS 2020	August 23 – 27	Cambridge United Kingdom	https://mtns2020.eng.cam.ac.uk/erd30@eng.cam.ac.uk
6 th IFAC Workshop on Mining, Mineral and Metal Processing MMM 2021	September 01 – 03	Nancy France	http://mmm2021.cran.univ-lorraine.fr/mmm-2021@univ-lorraine.fr
20 th IFAC Conference on Technology, Culture and International Stability TECIS 2021	September 14 – 17	Moscow Russian Federation	http://www.tecis2021.com/
3 rd IFAC Conference on Modelling, Identification and Control of Nonlinear Systems MICNON 2021	September 15 – 17	Tokyo Japan	http://micnon2021.org/
11 th IFAC Symposium on Biological and Medical Systems BMS 2021	September 19 – 22	Ghent Belgium	https://bms2021.ugent.be/bms2021@ugent.be
13 th IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles CAMS 2021	September 22 – 24	Oldenburg (virtually) Germany	https://cams-2021.com

Calendar of IFAC Events


Title	2021	Place	Further Information
6 th IFAC Conference on Analysis and Control of Chaotic Systems CHAOS 2021	September 27 – 29	Catania Italy	http://chaos2021.unict.it/ chaos2021@unict.it
16 th IFAC Workshop on Time Delay Systems TDS 2021	Sept./Oct. 29 – 01	Guangzhou China	https://tds2021.ee.cityu.edu.hk/ tds2021@ee.cityu.edu.hk
7 th IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control LHMNC 2021	October 11 – 13	Berlin Germany	https://lhmnc21.org contact@lhmnc21.org
AACC Conference on Modeling, Estimation and Control MECC 2021	October 24 – 27	Austin, TX USA	https://mecc2021.a2c2.org/
Conference on Control Conference Africa (in cooperation with IFAC) CCA 2021	December 07 – 08	Magalies South Africa	https://cca2021.org/
Title	2022	Place	Further Information
Vienna International Conference on Mathematical Modelling MATHMOD 2022	February 16 – 18	Vienna Austria	http://not yet available
14 th IFAC Workshop on Intelligent Manufacturing Systems IMS 2022	March 28 – 30	Tel-Aviv Israel	http://not yet available
ACA, ICROS, SICE, IFAC et al. Conference on Asian Control Conference (in cooperation with IFAC) ASCC 2022	May 04 – 07	Jeju Island Republic of Korea	http://ascc2021.org/
17 th IFAC Conference on Programmable Devices and Embedded Systems PDES 2022	May 17 – 19	Sarajevo Bosnia and Herzegovina	http://pdes-conference.eu/ dejan.jokic@ibu.edu.ba
11 th IFAC Symposium on Fault Detection, Supervision and Safety for Technical Processes SAFEPROCESS 2022	June 07 – 10	Pafos Cyprus	https://safeprocess2021.eu/
13 th IFAC Symposium on Dynamics and Control of Process Systems, including Biosystems DYCOPS 2022	June 14 – 17	Busan Republic of Korea	http://dycops2022.org/ secretariat@dycops2022.org
11 th IFAC Symposium on Control of Power and Energy Systems CPES 2022	June 21 – 23	Moscow Russian Federation	https://cpes2021.com/ cpes2021@ipu.ru
13 th IFAC Symposium on Advances in Control Education ACE 2022	July 24 – 27	Hamburg Germany	http://not yet available
19 th IFAC Symposium on Control, Optimization and Automation in Mining, Mineral and Metal Processing MMM 2022	August 15 – 18	Montreal Canada	http://not yet available
10 th IFAC Symposium on Robust Control Design ROCOND 2022	August/Sept. 30 – 02	Kyoto Japan	http://rocond21.ee.t.kyoto-u.ac.jp/index.html rocond2021-secretariat@googlegroups.com

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