International Federation on Automatic Control
Activities' Report - Year 2017

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1. Introduction

IFAC is an organization of Nations founded in 1956. Each nation is represented by a "National member Organization" (NMO). CNR is the Italian NMO for IFAC.   There are currently 48 nations participating to IFAC, i.e. Argentina, Austrialia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Cuba, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, India, Ireland, Israel, Italy, Japan, South Korea, Republic of Kosovo, Lithuania,   Malaysia, Mexico, Netherlands, Norway, Peru, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, United Kingdom, Usa.

IFAC activities are mainly focussed on the organization of scientific events (about 40 per year) and publications (7 journals) in a variety of diverse control disciplines. The scientific areas are articulated in 9 Coordinating Committee (CC), each of them includes a few Technical Commitees (TC). The flagship event is the triennal world congress (Milan 2011, Cape Town 2014, Toulouse 2017, Berlin 2000), but IFAC also sponsors Symposia, Conferences and Workshops. Additional information are in the IFAC web site: http://www.ifac-control.org/ .

The CNR italian delegate partecipates to the works of the General Assembly (GA), the most important parliamentary body of IFAC. The GA dictates the rules for partecipating nations, discusses the entrance of new members, according to the articles of the IFAC constitution, listen and reports the works of the Executive Board and Technical Board.

2. Main activities carried on by the International Federation on Automatic Control (IFAC) during 2017 relevant for Italy and for CNR

2017 was the year of the IFAC World Congress. The Italian delegates   were Patrizio Colaneri (Politecnico di Milano & IEIIT-CNR) and Fabrizio Dabbene (IEIIT-CNR).

3. Activities carried on by (Italian Delegate name) within the Union during 2017 and impact on the Italian scientific community

3.1) IFAC World Congress

In 2017 there was the triennal World Congress in July in Toulouse (France) from Monday 10 to Friday 14, July 2017. These five days covered the technical-scientific activities, namely the oral/interactive presentations of the international delegates, organized in many parallel sessions.

The activities related to the organization and representative functions were carried out in the preceeding week end (Saturday-Sunday July 8,9) and the successive saturday (July 15).

Italy was the fifth country more represented in the congress with 175 delegates, after France (829), Germany (295), China (284) and USA (237). The next Congress will be in Berlin in 2000.

The Italian NMO coordinator (Patrizio Colaneri) participated in the Congress as co-author of a paper, co-organizer of a session, member of the Technical Board and representative of the Italian NMO (CNR). In this last role he participated to the General Assembly, held on Monday July 10. Other italian IFAC delegates participated in teh GA, namely Fabrizio Dabbene – vice Italian NMO coordinator, Alberto Isidori, president of the IFAC foundation, Sergio Bittanti, IFAC Vice president and Chair of the Executive Board. A part from standard discussions and official duties, in the GA it was decided to remove Hong Kong from the IFAC countries with an NMO, being Hong Kong returned to China.

A special session was held to commemorate the past Italian NMO coordinator, Director of Research of CNR, Roberto Tempo, prematurely passed away in 2017: "A Tribute in Memory of Roberto Tempo", by T Başar, A Isidori, B R Barmish, F Dabbene, H Ishii and A V Proskurnikov. The session was highly attended and moving.

Awards given to Italian delegates during the 2017 Congress:

- Young Author Prize: This prize, created in 1986, is awarded at IFAC World Congresses for the best paper of which the first and presenting author is younger than 30 years. In 2017 the prize was given to Luca Deori (Italy) for the paper: "On the connection between Nash equilibria and social optima in electric vehicle charging control games", authored by Luca Deori, Kostas Margellos, Maria Prandini.
- Automatica paper prize: The Automatica Paper Prize is awarded for outstanding contributions to the theory and/or practice of control engineering or control science, documented in a paper published in the IFAC Journal *Automatica*. At each IFAC World Congress the prize is awarded to the authors of three selected papers published in *Automatica* in the three years preceding the Congress. The prize funds are provided by the publisher of *Automatica*, Elsevier Ltd. In 2017 the prize was given to G. Pillonetto for the paper "A new kernel-based approach to hybrid system identification."
- Nonlinear Analysis: Hybrid Systems Paper Prize: Being established in 2015, the Nonlinear Analysis: Hybrid Systems Paper Prize is awarded for outstanding contributions to the field of hybrid systems documented in a paper published in the IFAC Journal Nonlinear Analysis: Hybrid Systems. At each IFAC World Congress the prize is awarded to the authors of two selected papers published in the journal in the three years preceding the Congress. The prize funds are provided by the publisher of Nonlinear Analysis: Hybrid Systems, Elsevier Ltd. In 2017 the prize was given for the paper "Switched system approach to dynamic race modelling" autored by F. Blanchini, D. Casagrande, G. Giordano, U. Viaro, 2017.
- High Impact paper award: This IFAC Award was introduced in 2009 and first awarded in 2011. It acknowledges the impact of a paper published in any of the official IFAC journals on the broad areas of Automatic Control theory and application. A monetary prize is presented to the recipient together with a plaque. The winner for the triennium 2014-2017 was F. Blanchini for the paper: "Set Invariance in Control", published in the IFAC Journal *Automatica*, vol. 35, no. 11, 1999.

3.2) Italian participation in IFAC

The italian participation in IFAC has always been very important. The main positions held in 2017 are here indicated:

- Alessandro Astolfi – Università Roma Tor Vergata (Chair CC2 Design Method).
- Sergio Bittanti – Politecnico di Milano and CNR-IEIIT – (IFAC Vice President, chair of the Executive Board, currently IFAC Advisor),
- Paolo Bolzern – Politecnico di Milano - (E-media Editor of IFAC youTube channel, member of IFAC "Publication committee")
- Marco Campi – Università di Brescia (Chair TC 1.1 Modelling, Identification and Signal Processing, till July 2017)
- Alessandro Chiuso – University of Padoa (Chair TC 1.1 Modelling, Identification and Signal Processing, from July 2017)
- Patrizio Colaneri – Politecnico di Milano and CNR-IEIIT – (Italian NMO coordinator, Member of the Technical Board – publication Liason, member of the Publication Committee, TB liason)
- Giuseppe Conte – Università Politecnica delle Marche (Chair TC 2.2 Linear Control Systems, till July 2017)
- Fabrizio Dabbene – CNR-IEIIT (Chair TC 2.5 Robust Control, till July 2017)
- Alessandro Giua - Università di Cagliari (Editor in Chief IFAC journal "Nonlinear Analysis – Hybrid Systems", Member of the Publication Committee)
- Alberto Isidori – Università di Roma La Sapienza (Chair of IFAC Foundation, IFAC Advisor, Chair of the "High Impact Paper Award Committee")
- Laura Menini – Università di Roma Tor Vergata (Chair TC 2.1 Control Design)
- Diego Pareschi – ABB (member of "Policy Committee")
- Thomas Parisini – Università di Trieste (Chair TC 6.4 Fault Detection)
- Maria Prandini – Politecnico di Milano (Member of the policy committee)
- Maria Elena Valcher – University of Padova (Member of the Technical Board)
- Lorenzo Marconi- Università di Bologna (Chair TC 2.3 Nonlinear Control Systems, Member of the Publication Committee)

3.3) Workshops

3.3.1) Automatica 4.0

In this workshop the evolution of "Automatica" was traced back over the last 60 years, recalling the major milestones of its development, not just at Politecnico di Milano, but also in the national and international context, up to the innovative challenges of the fourth Industrial revolution. It is likely that Automatica will play a preminent role in tackling emerging complex scientific, industrial and social problems that will mark the years to come.

The workshop was chaired by Paolo Bolzern, it was introduced by the Rector of Politecnico di Milano, with a testimony of the role of CNR by the italian NMO coordinator Patrizio Colaneri. Main speeches were held by

- Prof. Luigi Nicolais, Prof. Emeritus of the University of Neaples "Federico II", Coordinator of the Technical Secretery for Political Research of the Italian Ministry of Education (MIUR) and past President of CNR

and by

- Sergio Bittanti, Professore of Automatica at Politecnico di Milano, Executive Chair of IFAC.

3.3.2) Perspective on System Identification and Control Science: a workshop to mark the lifetime achievement of Prof. Sergio Bittanti. *[From 2015 to 2017 Prof. Sergio Bittanti, professor at Politecnico and Associate to IEIIT-CNR, was Vice Chair of IFAC and the chair of the Executive Committe. He coordinated all executive committes (Administration and Finance, Awards, Policy, Publications) and the external relations of the Federation].*

On July 17th-18th, 2017, the workshop took place in Como. It was the occasion to reflect on the evolution of system identification and control, learning from the past and looking towards the future. Among the distinguished speakers there were the present IFAC president, Prof. Frank Allgöwer, and five past IFAC presidents, Prof. Albertos, Prof. Isidori, Prof. Kucera, Prof. Vamos, Prof. Craig.

3.3.3) Other initiatives:

a) The members of the italian control community gather every year for the SIDRA (Società Italiana dei Ricercatori di Automatica) workshop and the assembly, where in general the IFAC activities are reviewed. During the three-days meeting, held in Milano in September, a workshop was held in memory of Roberto Tempo, Italian representiive of CNR in IFAC.

b) Roberto Tempo was also remembered in a special Workshop held in Banyouls sur Mer the week before the IFAC Congress. The workshop was co-organized – from the scientific side - by Fabrizio Dabbene (Senior researcher at IEIIT-CNR, Italian NMO Vice Coordinator), and Luca Zaccarian (local organizer from LAAS-CNRS, France).

c) A session to remember Roberto was organized by Fabrizio Dabbene (IEEIT-CNR) in the flagship conference of Control, namely the Conference on Decision and Control DC, in Mebourne in December 2017.

3.4) Meetings

Prof. Sergio Bittanti (Politecnico di Milano and IEIIT-CNR) participated in the "interim IFAC meeting" held in Vienna (April 2007), in his capacity as IFAC Vice president and Chair of the IFAC Executive Board. The meeting has the scope of coordinating all the future IFAC activities.

4. Evaluation of the participation in terms of benefits and membership cost

IFAC activities span different field of control engineering and promote science through high quality publications. Is a multinational no-profit organization and there is no membership fee.

5. Evaluation of Italians' attendance and how to improve interest and involvement

Italy is a country participating in IFAC since start (1957). Participation in IFAC means: papers in IFAC journals and conferences, presentation of papers in IFAC events, involvement in the organization of scientific events, involvement in the technical and executive committees, etc... Italy participation has always been important with high number of people involved in all the directions detailed above. There is a recognized interest for IFAC in the Italian community, strengthened by the numerous initiatives that IFAC (through its officers) carries on every year.

6. Italian experts with important roles within the Union or within related Commissions and Programs

6.1) IFAC Fellows

Alessandro Astolfi, Sergio Bittanti, Patrizio Colaneri, Guido Guardabassi, Alberto Isidori, Edoardo Mosca, Thomas Parisini, Bruno Siciliano, Roberto Tempo (*), Giorgio Picci, Antonio Vicino.

(*) Roberto Tempo, director of research of IEIIT-CNR and past Italian NMO coordinator, passed away prematurely in 2017.

6.2) Italian IFAC outstanding service award recepients

G. Guardabassi, S. Bittanti, A. Isidori, P. Colaneri, A. Giua

6.3) Major Awards

6.3.1) Quazza Medal: Alberto Isidori, 1996

6.3.2) High Impact paper award: F. Blanchini, 2017

6.4) Journal prizes

6.4.1) Automatica paper prize: Franco Blanchini, 2002; C. Bonivento, A. Isidori, L. Marconi, A. Paoli, 2005; G. Pillonetto, 2017.

6.4.2) Control Engineering Practice Paper Prize: M.Corno, S. Savaresi, M. Tanelli, A. Fabbri, 2011.

6.4.3) Journal of Process Control Paper Prize: G. Pin, V. Francesconi,F. Cuzzola,T. Parisini, 2014

6.4.4) Journal of Engineering Applications of Artificial Intelligence Paper Prize: M. Barletta, A. Gisario, S. Guarino, 2008.

6.4..5) Nonlinear Analysis: Hybrid Systems Paper Prize: F. Blanchini, D. Casagrande, G. Giordano, U. Viaro, 2017.

6.5) Congress prizes

6.5.1) Young Author Prize
Luca Deori, 2017.
6.5.2) Application paper prize
A. Ballucchi, L. Benvenuti, A. Sangiovanni-Vincentelli, G. Serra, C. Lemma, 2005.
6.5.3) Interactive Paper prize
M. Corno, P. Spagnol, S. Savaresi , 2014

7. Conclusions

The impact on the national scientific community is highly remarkable. The italian control community is very active in the participation to events sponsored by IFAC, in the organization of such events, in the revision process of the papers presented in IFAC events, in the rosters of technical commitees and editorial boards of IFAC journals.

IFAC activities in IFAC are in good shape, both form the qualitative and quantitative viewpoints. In 2017, Congress year, according to the constitution, there were no events sponsored by IFAC.

In 2018 there will be IFAC events in Italy:

- "15° IFAC Symposium on Control in Transportation Systems (CTS), to be held in Savona in June".
- "IFAC Workshop on Integrated Assessment Modelling for Environmental Systems - 1st IAMES 2018, Brescia".
- "IFAC/IEEE Workshop on Discrete-time Systems, Sorrento"
- "IFAC/IEEE Symposium on Information Control Problems in Manufactoring, Bergamo".

April 10, 2017

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