



## Dott. Ing. Alessandro Pilloni (M.Sc.'10, Ph.D.'13)

Assistant Professor @ Università degli Studi di Cagliari, Dept. Electrical and Electronic Engineering, Italy.

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### Short Biography

Alessandro Pilloni (M.Sc.'10, Ph.D.'13, IEEE Member '19) is currently Assistant Professor (Rtd-B, art. 24, comma 3, lettera b), Legge 240/10) at the University of Cagliari, Dept. Electrical and Electronic Engineering, Italy. Since 2010 he has lectured in the course of Automatic Control, and the course of Nonlinear Control for Engineers.

Currently, he holds the courses:

- [IA/0134/EN] “Stochastic Models (50 hours)”, offered in English, for the master’s degrees [70/91] “Internet Engineering” and [70/90] “Computer Engineering, Cybersecurity and Artificial Intelligence”;
- [IA/0410] “Principi di Automazione Industriale (48 hours)”, offered in Italian, for the Professional Bachelor's Degree course [L-P03] Industrial Technologies for Energy and Digital Transition.

His research interests include nonlinear control and variable structure control theory and its application to control, observation, and fault detection for finite and infinite-dimensional dynamical systems. Fields of specialization include the control and observation for distributed-parameter systems and multi-agent systems theory, with focus on cooperative control and optimization over networks. Recent applications include the distributed control of smart grids and the coordination smart loads for demand-side management purposes. Dr. Pilloni has spent visiting periods at universities and research centers in UK, Spain, and Serbia. He co-authored 1 industrial patent, 16+ papers on international journals, 5 chapters in monographic books of international relevance, and 30+ papers in conference proceedings, for which he received more than 730+ citations and an h-index of 13 (source: Google Scholar).

While serving as a reviewer for most of the scientific journals and conference editorial boards of the IEEE CSS and IFAC, he also worked as Associate Editor for the 2023 IEEE International Conference on Systems, Man, and Cybernetics.

At present, he meets the Italian requirements for being considered for Associate Professor positions (Professore di II° fascia) in the scientific area 09/G1 AUTOMATICA - ING-INF/04 (art. 16, comma 1, Legge 240/10). This eligibility is valid from January 31, 2022, to January 31, 2031.

He is also qualified to enroll in the Italian Register of Information Engineers and he used to serve as an Automation Engineer and Technical Consultant to small and medium-sized businesses in the local area. (Last update: April 23, 2024)

### Research interests:

- Variable structure control theory and sliding mode control
- Observation and control of complex networked systems
- Multi-agent control and distributed optimization
- Microgrid Control and Renewable Distributed Generation;
- Demand Side Management in Urban Areas
- Thermal systems and Distributed Parameter Systems

### Academic indicators (23/04/2024)

- Patents: 1
- Journal papers: 16+
- Chapters in monographic books: 5
- Conference proceedings with ISBN: 27+
- Citations: 730 (Google Scholar); 597 (Scopus).
- H-index: 13 (Google Scholar); 11 (Scopus).

## National Academic Qualification as Associate Professor (ASN)

**2022** Italian qualification for the access to associate professor positions (professore di II fascia) within the scientific research area: ING-INF/04 (AUTOMATICA); validity from 31/01/2022 to 31/01/2031 (art. 16, comma 1, Legge 240/10).

## Education

**May 2013:** Ph.D. in Industrial Engineering, Dept. of Electrical and Electronic Engineering, University of Cagliari, Italy. Thesis: "Robust Observation and Control of Complex Networks ". Advisor: Prof. E. Usai.

**Dec. 2010:** Ph.D. in Industrial Engineering, Dept. of Electrical and Electronic Engineering, University of Cagliari, Italy. Thesis: "Model based fault detection on inductions motors". Advisor: Prof. Usai

## Academic positions

**2023 Sep (ongoing)** Assistant professor (Ricercatore tempo determinato tipo B art. 24 of Law 240/2010). University of Cagliari-DIEE. Position financed by the Italian Ministry of University and Research (MUR) "Progetto di sviluppo dipartimenti di eccellenza ex art.1, commi 314-337, della legge 232/16".

**2022 Oct-2023 Sep** Postdoctoral research fellowship (art. 22 of Law 240/2010). University of Cagliari. SSD ING-INF/04 – SC 09/G1 AUTOMATICA. Position financed by the Dept. Electrical and Electronic Engineering of the University of Cagliari (IT), under the departmental project: DICOSI. Research grant: Controllo e stima di sistemi dinamici interconnessi e/o incerti. Supervisor: Prof. Elio Usai.

**2022 Aug-2019 Sep** Assistant professor (Ricercatore tempo determinato tipo A art. 24 of Law 240/2010). University of Cagliari-DIEE. Position financed by the Sardinian Regional Government, project: ODISS "Ottimizzazione di sistemi DISTRIBUITI in ambito Smart-city e Smart-grid", call P.O.R. SARDEGNA F.S.E. 2014-2020 –Asse III "Istruzione e Formazione.

**2019 Aug-2018 Nov** Postdoctoral research fellowship (art. 22 of Law 240/2010). University of Cagliari-DIEE. SSD ING-INF/04–SC 09/G1 AUTOMATICA. Position financed by Sardinian Regional Government, project: Models and control algorithms for the management of a Virtual Power Plant. Supervisor: Prof. Mauro Franceschelli.

**2018 Oct -2017 Nov** Postdoctoral research fellowship (art. 22 of Law 240/2010). University of Cagliari. SSD ING-INF/04 – SC 09/G1 AUTOMATICA. Position financed by National MIUR, project: Cooperative constrained optimization of networked domestic thermal systems for efficient and coordinated urban energy consumption. Supervisor: Prof. Mauro Franceschelli.

**2017 Oct- 2017 Feb** Research fellowship University of Cagliari-DIEE. SSD ING-INF/04 – SC 09/G1 AUTOMATICA. Position financed by Sardinian Regional Government, project: Sviluppo, progettazione e realizzazione prototipale di sistemi di gestione e controllo ottimali per una Micro Smart Grid (L.R. 7/2007), tender n.4: Metodologie e tecnologie innovative per la gestione ottimale delle Micro-Smart Grid". Supervisor: Prof. Elio Usai.

**2016 Dic- 2014 Nov** Postdoctoral research fellowship (art. 22 of Law 240/2010). University of Cagliari-DIEE. SSD ING-INF/04 – SC 09/G1 AUTOMATICA. Position financed by Sardinian Regional Government, project "Modellazione, controllo e sperimentazione di sistemi innovativi per l'accumulo di energia" (L.R. 7/2007 – rif. CRP--60193) CUP F71J12000880002. Supervisor: Prof. Alessandro Pisano

**2015 Feb-2014 Oct** Contract researcher (Contratto di lavoro autonomo di supporto alla ricerca). University of Cagliari. Activity: Development of algorithms for the decentralized estimation of faults and disturbances in complex systems. Supervisor: Prof. Elio Usai

**2014 Sep-2014 Jun** Contract researcher (Contratto di lavoro autonomo di supporto alla ricerca). University of Cagliari-DIEE. Position financed by the Sardinian regional government, project: "Modellazione, controllo e sperimentazione di sistemi innovativi per l'accumulo di energia" (L.R. 7/2007 – rif. CRP--60193) CUP F71J12000880002 – Prof. Alessandro PISANO.

**2013 Sep-2013 Aug** Contract researcher (COCOCO). University of Cagliari-DIEE. Position financed by national project "PRIN 2009 Controllo ed osservazione dello stato per sistemi di ordine non intero in presenza di disturbi ed incertezze di modello". Supervisor: Prof. Alessandro PISANO.

### Visiting positions/periods:

**Nov. 2014:** Visiting Researcher at the “Signal and System Department, School of Electrical Engineering”, University of Belgrade (SRB) under the project “RObust Decentralised Estimation fOr large-scale systems (RODEO)”. Local supervisor: Dr. Prof. Željko Đurović.

**Feb.-Jul. 2012:** Visiting Researcher at the “Control and Instrumentation Research Group”, University of Leicester (UK) under the Post-Graduate Erasmus Exchange Program. Local supervisor: Dr. Prof. C. Edwards.

**Jan. 2012.** Visiting Researcher at the “Dept. of Electrical Engineering”, Universitat Politècnica de València (ESP) under the European FP7 project “Plant Robustification Based on Fault Detection and isolation Algorithms (PRODI)”. Local supervisor: Prof. J. Roger-Folch.

### Awards

**2013:** Second Prize in section A4 of the national competition for research grants, call "Energy for research" promoted by ENEL Foundation and Fondazione CRUI, Topic: "Smart grids and renewables: analysis of best practices and development options"

### Participation to research projects

**2023 (ongoing)** PNRR Italian Research project: “e.INS - Ecosystem of Innovation for Next Generation Sardinia Spoke 7 – Low carbon technologies”. Coordinator: Prof. F. Pilo. Role: **Member of the research unit** in “WP4:Energy Communities” and “WP7: Digitalization, smar grid and flexibility”.

**2023-2020** Regional project Fondazione di Sardegna (L.R. 7/2007 annualità 2020) IQSS “Information Quality aware and Secure Sensor networks for smart cities”. Coordinator: Paolo Attilio Pegoraro. Role: **Responsible for the Sub-unit 2: Control and Data Processing.**

**2019-2021** Regional project FSC 2014-2020 Regione Autonoma della Sardegna, call “RICERCA DI BASE 2017”: “Metodi formali per il MOnitoraggio di SIstemi dinamici Multi-Agente (MOSIMA)”. Code RASSR05871. Role: **Member of the research unit.**

**2021- 2019** Regional project Fondazione di Sardegna (L.R. 7/2007 annualità 2019) SISCO “ICT methodologies for the security of complex systems”. Principal investigator: Pisano Alessandro. Role: **Member of the research unit.**

**2019-2021** Regional project FSC 2014-2020 Regione Autonoma della Sardegna, call “RICERCA DI BASE 2017”: “Metodi formali per il MOnitoraggio di SIstemi dinamici Multi-Agente (MOSIMA)”. Code RASSR05871. Role: **Member of the research unit.**

**2021- 2019** Regional project Fondazione di Sardegna (L.R. 7/2007 annualità 2019) SISCO “ICT methodologies for the security of complex systems”. Principal investigator: Pisano Alessandro. Role: **Member of the research unit.**

**2019-2018** Regional research project (art.22 L. 240/2010) “Models and control algorithms for the management of a Virtual Power Plant (VPP)”. **Supervisor:** Dr. M. Franceschelli. Role: **Research fellowship (art. 22 of Law 240/2010).**

**2019-2017** Regional project Fondazione di Sardegna (L.R. 7/2007 annualità 2017) ODIS “Optimization of DIstributed systems in the Smart-city and smart-grid settings”. Principal investigator: Pisano Alessandro. Role: **Member of the research unit.**

**2017-2018** National MIUR research project (art.22 L. 240/2010) “Cooperative constrained optimization of networked domestic thermal systems for efficient and coordinated urban energy consumption”. code: RBSI14OF6H. **Supervisor:** Dr. M. Franceschelli. Role: **Research fellowship (art. 22 of Law 240/2010)**

**2017 Oct-Apr** Regional research project “Development, design and prototyping of optimal control systems for Micro Smart Grids”. **Supervisor:** Prof. E. Usai. Role: **Contract researcher.**

**2016-2014** Regional research project (art.22 L. 240/2010) “Development of robust control algorithms and model-based fault diagnosis strategies for the improvement of reliability of energy systems. **Supervisor:** Dr. A. Pisano. Role: **Research fellowship (art. 22 of Law 240/2010).**

- 2016 Nov-2014 Sep** National MAECI research project “RObust Decentralised Estimation fOr large-scale systems (RODEO)” del Ministero degli Affari Esteri. Code: MAE-PGR00152. **Supervisor:** Prof. E. USAI. Role: **Contract researcher.**
- 2014 Aug-May** Regional research grant (L.R. 7/2007) “Modeling, control and testing of innovative energy storage systems”. **Presso:** DIEE- UNICA. **Supervisor:** Dr. A. Pisano. Role: **Contract researcher.**
- 2014 Mar-2013 Sep** National research project “PRIN 2009 Controllo ed osservazione dello stato per sistemi di ordine non intero in presenza di disturbi ed incertezze di modello”. **Presso:** DIEE-UNICA. **Supervisor:** Dr. A. Pisano. Role: **Contract researcher.**
- 2014-2011** European research project call FP7 “HYCON2” (Grant Agreement n.257462), 2010-2014: “Highly-complex and networked control systems”. Local supervisor: Prof. A. Giua. **Member of the research unit.**
- 2011-2010** European research project call FP7 “PRODI” (Grant Agreement n.2242332), 2008-2011: “Plant Robustification Based on Fault Detection and isolation Algorithms. Local supervisor: Prof. E. Usai. **Member of the research unit.**

### Editorial activities

#### Associated Editor:

- 2023 IEEE Conference on Systems Man and Cybernetics (SMC)

#### Technical reviewer for International Journals (from Jan. 2012 until today (more than 120 papers))

- **IEEE Journals:** Transactions on Automatic Controls (TAC); Transactions on Control Systems Technologies (TCST); IEEE Control Systems Letters (L-CSS); Transactions on Industrial Electronics (TIE); Transactions on Control of Network Systems (TCNS); Transactions on Smart Grid (TSG); Transactions on Sustainable Energy (TSTE); Transactions on Power Electronics (TPS); Transactions on Automation Science and Engineering (T-ASE); Transactions on Systems, Man and Cybernetics: Systems (SMCA).
- **Elsevier Journals:** Automatica; Nonlinear Analysis: Hybrid Systems (NAHS); Journal of the Franklin Institute.
- **Wiley Journals:** International Journal of Robust and Nonlinear Control (RNC); International Journal of Adaptive Control and Signal Processing (ACSP); Asian Journal of Control (AJC); IET Control Theory & Applications.
- **Springer Journals:** Acta Mathematica Scientia.
- **MDPI Journals:** Energies; Sustainability.

#### Technical reviewer for International Conferences Proceedings (from Jan. 2012 until today)

- IEEE Conf. on Decision and Control (CDC). Year: 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023
- IFAC World Congress. Year: 2014, 2017, 2023
- IEEE Conf. on Systems Man and Cybernetics (SMC). Year: 2023
- International Workshop on Variable Structure Systems and Sliding Mode Control (VSS). Year: 2014, 2018, 2022
- IEEE American Control Conference (ACC). Year: 2012, 2013, 2015, 2016, 2017, 2018
- IEEE European Control Conference (ECC). Year: 2016, 2021
- Mediterranean Conference on Control and Automation (MED). Year: 2021
- IEEE International Conference on Automation Science and Engineering (CASE). Year: 2017, 2019, 2023
- International Conf. System Theory, Control and Computing (ICSTCC). Year: 2015
- IFAC Symposium on Mechatronic Systems. Year: 2013
- IEEE Multi-Conference on Systems and Control. Year: 2012
- IEEE International Conference on Control Applications. Year: 2012
- IEEE Conference on Decision and Control and European Control Conference (IEEE CDC-ECC) Year: 2011

### Invited Talks and Seminars

- 2022** Invited Talks to periodic webinars organized by IEEE Tech. Committee on Variable Structure and Sliding Mode Control, organized by Prof. Leonid Fridman of the National Autonomous University of Mexico (UNAM), Mexico City, (Mexico). Talk title: “Recent Advances in Sliding-Mode Control for coupled parabolic PDE-ODE systems dynamics”
- 2020** Invited Talks to the webinar: "A Webinar on Under Graduate Control Engineering Practices " organized by the Knowledge Institute of Engineering and Technology (KITE), Bakrol, Anand (India). Talk title: “Control theory tested via a DC motor setup: the experience at the University of Cagliari”
- 2014** Invited talks to the "RObust Decentralised Estimation fOr large-scale systems (RODEO) - Work-in-Progress Meeting" helds at the Computer Center of the School of Electrical Engineering - Bulevar Kralja Aleksandra 73, Belgrade (SRB). Nov. 11, 2014. Talk title: “Model based FDI via sliding modes”

**2012** Seminar lesson at the Universitat Politècnica de València, València, SPAIN in quality of visiting researcher  
Day 1 (09/01/2012): Robust FDI in Induction Motors via Second Order Sliding Mode Technique  
Day 2 (20/01/2012): Robust FDI in Induction Motors New results and Future developments

### Teaching activities

**2023-2024:** Lecturer of the course “Principi di Automazione Industriale (48 hours)”, Professional Bachelor's Degree course on Industrial Technologies for Energy and Digital Transition, University of Cagliari. Teaching language: Italian.

**2024-2019:** Lecturer of the course “Stochastic processes”, Master degree Computer Engineering, Artificial Intelligence and Cybersecurity, University of Cagliari. Teaching language: English.

**2018-2017:** Teaching assistant of the course “Controlli Automatici” (Automatic Control). Lecturer: Prof. E. Usai. Bachelor degree in Electronics Engineering, University of Cagliari. 25h of teaching support.

**2018-2010:** Teaching assistant of the course “Controlli Automatici” (Automatic Control). Lecturer: Prof. E. Usai. Bachelor degree in Electronics Engineering, University of Cagliari. 20h of teaching support.

**2018-2010:** Teaching assistant of the course “Sistemi di controllo avanzati” (Advanced Control Systems). Lecturer: Prof. E. Usai. Master degree in Electronics Engineering, University of Cagliari. 14h of teaching support.

**2017-2012:** Teaching assistant of the course “Sistemi di supervisione e controllo industriali” (Industrial supervisory control systems). Lecturer: Prof. E. Usai. Master degree in Electronics Engineering, University of Cagliari. 6h of teaching support.

### Supervision/Co-supervision of PhD students and Students at University of Cagliari

**2024** Leonardo Callia. “Strict Lyapunov Functions for Second-Order Sliding Mode Robust Consensus with the Super-Twisting Algorithm”. Master thesis in Electronic Engineering, 2024. Supervisor. (*ongoing*)

**2023** Matheus Borges Ungaretti. “Signal Interpreted Coloured Petri Nets: A new high-level Petri net definition for implementation in microcontrollers using low-level signals”. Visiting PhD student from the Universidade Federal de Minas Gerais (Brazil). Brazilian supervisor: Prof. Eduardo José Lima II. **Italian Co-supervisor.** (*ongoing*)

**2021** Milad Golami. “Multi-agent-based control of microgrids with delayed communications”. PhD in Industrial Engineering. **Co-supervisor.**

**2020** Alessio Falace. “Validation and testing of a PLC-oriented control architecture for improving the energy efficiency in smart buildings”. Master thesis in Electronic Engineering. **Supervisor.**

**2019** Paolo Murru. “Experimental Validation of Delta Coding Algorithms based on higher-order sliding-mode”. Degree thesis in Electric and Electronic Engineering. **Supervisor.**

**2017** Carlo Atzeni. “Progettazione e realizzazione, tramite PLC, di un controllore di temperatura e portata per un impianto a concentrazione solare termodinamico”. Master thesis in Electronic Engineering. **Co-supervisor.**

**2017** Gabriele Fois. “Comparative-performance analysis of Sigma-Delta modulation techniques based on higher order sliding mode algorithms”. Degree thesis in Electric and Electronic Engineering, 2017. **Co-supervisor.**

**2017** Flavia Serri. “Microgrid Control Strategies for Seamless Transition Between Grid-Connected and Islanded Modes”. Master thesis in Electric Engineering, 2017. **Co-supervisor.**

**2017** Claudio Gloriani “Ripristino della connettività in reti mobili manets mediante approcci graph-theoretic. Master thesis in Mechanical Engineering, 2017. **Co-supervisor.**

### Patent

**2018:** Patent (Italy): “Metodo ed architettura di gestione della domanda energetica di tipo multi-agente per la riduzione dei picchi di consumo elettrico di una pluralità di apparecchiature elettriche” Inventors: Franceschelli Mauro, Pisano Alessandro, Pilloni, Alessandro, Gasparri Andrea. Reference number 102018000006385, date 15/06/2018.

## International Journal

[J17] Orlov Y., Pilloni A., Pisano A., Usai E. (2022) "Boundary control of an uncertain heat process with unmatched disturbance and dynamic actuator", in IEEE TRANSACTIONS ON AUTOMATIC CONTROL (under review).

[J16] Pilloni A., Pisano A., Usai E. (2024), "Semi-global fixed-time state-estimation and unknown input reconstruction via first-order sliding mode observers with delay", in IEEE TRANSACTIONS ON AUTOMATIC CONTROL (accepted).

[J15] Ungaretti Borges M., Pilloni A., Ribeiro Pontes G., Seatzu C., Jose Lima II E. (2024), "Signal-Interpreted Coloured Petri Nets: A Modelling Tool for Rapid Prototyping in Feedback-Based Control of Discrete Event Systems". Elsevier Control Engineering Practice (under review).

[J14] Pilloni A., Franceschelli M., Pisano A., Usai E. (2023), On the variable structure control approach with sliding modes to robust finite-time consensus problems: A methodological overview based on nonsmooth analysis, Annual Reviews in Control. ISSN 1367-5788, doi:10.1016/j.arcontrol.2023.04.002.

[J13] Pilloni A., Pisano A., Usai E. (2022) "A global finite-time stable first-order sliding-mode strong observer with certain semi-global fixed-time convergence characteristics", in IEEE TRANSACTIONS ON AUTOMATIC CONTROL (under review).

[J12] Kaheni M., Pilloni A., Ruda G. S., Usai E., Franceschelli M., "Distributed Asynchronous Greedy Control of Large Networks of Thermostatically Controlled Loads for Electric Demand Response," in IEEE CONTROL SYSTEM LETTERS, 2022, doi: 10.1109/LCSYS.2022.3186617.

[J11] Koch S., Pilloni A., Pisano A., Usai E. (2022). Sliding-Mode Boundary Control of an In-Line Heating System Governed by Coupled PDE/ODE Dynamics. IEEE TRANSACTION ON CONTROL SYSTEM TECHNOLOGY, doi: 10.1109/TCST.2022.3147373

[J10] Pilloni A., Deplano D., Giua A., Usai E. (2021). A Sliding Mode Observer Design for the Average State Estimation in Large-Scale Systems. IEEE CONTROL SYSTEMS LETTERS, vol. 6, p. 632-637, ISSN: 2475-1456, doi: 10.1109/LCSYS.2021.3084526

[J9] Gholami M., Pilloni A., Pisano A., Usai E. (2021). Robust distributed secondary voltage restoration control of ac microgrids under multiple communication delays. ENERGIES, vol. 14, p. 1-22, ISSN: 1996-1073, doi: 10.3390/en14041165

[J8] Pisano A., Orlov Y., Pilloni A., Usai E. (2020). Combined Backstepping/Second-Order Sliding-Mode Boundary Stabilization of an Unstable Reaction-Diffusion Process. IEEE CONTROL SYSTEMS LETTERS, vol. 4, p. 391-396, ISSN: 2475-1456, doi: 10.1109/LCSYS.2019.2927185

[J7] Pilloni A., Franceschelli M., Pisano A., Usai A. (2020). Sliding mode-based robustification of consensus and distributed optimization control protocols. IEEE TRANSACTIONS ON AUTOMATIC CONTROL, p. 1-8, ISSN: 1558-2523, doi: 10.1109/TAC.2020.2991694

[J6] Franceschelli M., Pilloni A., Gasparri A. (2020). Multi-Agent Coordination of Thermostatically Controlled Loads by Smart Power Sockets for Electric Demand Side Management. IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY, p. 1-13, ISSN: 1063-6536, doi: 10.1109/TCST.2020.2974181

[J5] Pilloni A., Franceschelli M., Pisano A., Usai E. (2019). Delta modulation (Delta-M) via second-order sliding-mode control technique. CONTROL ENGINEERING PRACTICE, vol. 92, p. 1-10, ISSN: 0967-0661, doi: 10.1016/j.conengprac.2019.104129

[J4] Pilloni A., Pisano A., Usai E. (2018). Robust Finite-Time Frequency and Voltage Restoration of Inverter-Based Microgrids via Sliding-Mode Cooperative Control. IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, vol. 65, p. 907-917, ISSN: 0278-0046, doi:10.1109/TIE.2017.2726970

[J3] Orlov, Y., Pisano, A., Pilloni, A., Usai, E. (2017). Output feedback stabilization of coupled reaction-diffusion processes with constant parameters. SIAM JOURNAL ON CONTROL AND OPTIMIZATION, vol. 55, p. 4112-4155, ISSN: 0363-0129, doi: 10.1137/15M1034325

[J2] Pilloni A., Pisano A., Orlov Y., Usai E. (2016). Consensus-Based Control for a Network of Diffusion PDEs with Boundary Local Interaction. IEEE TRANSACTIONS ON AUTOMATIC CONTROL, vol. 61, p. 2708-2713, ISSN: 0018-9286, doi:10.1109/TAC.2015.2506990

[J1] Pilloni A., Pisano A., Usai E. (2015). Observer-Based Air Excess Ratio Control of a PEM Fuel Cell System via High-Order Sliding Mode. IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, vol. 62, p. 5236-5246, ISSN: 0278-0046, doi:10.1109/TIE.2015.2412520

### Book chapters

[B5] A. Pilloni, A. Pisano, Y. Orlov, E. Usai. (2022) Second-order sliding mode leader-follower consensus for networked uncertain diffusion PDEs with spatially-varying diffusivity. In: Sliding-Mode Control and Variable-Structure Systems. Springer Nature Switzerland.

[B4] Pilloni A., Gholami M., Pisano A., Usai E. (2020). On the Robust Distributed Secondary Control of Islanded Inverter-Based Microgrids. Studies in Systems, Decision and Control. STUDIES IN SYSTEMS, DECISION AND CONTROL, vol. 271, p. 309-357, Gewerbestr: Springer Nature Switzerland AG, ISBN: 978-3-030-36620-9, ISSN:2198-4182, doi: 10.1007/978-3-030-36621-6\_11

[B3] Pilloni, Alessandro, Pisano, Alessandro, Usai, Elio (2018). Robustification of cooperative consensus algorithms in perturbed multi-agent systems. In Variable Structure Systems and Sliding Mode Control. Theory and Applications. STUDIES IN SYSTEMS, DECISION AND CONTROL, vol. 115, p. 247-267, Cham: Springer, ISBN: 978-3-319-62896-7, ISSN: 2198-4182, doi: 10.1007/978-3-319-62896-7\_10

[B2] G. Fadda, M. Franceschelli, A. Pilloni, A. Pisano, E. Usai, Z. Đurovic, A. Marjanovic, V. Papic, P. Tadic, S. Vujnovic, "RObust Decentralised Estimation fOR large-scale systems (RODEO)", in Serbia – Italia: Italian - Serbian Cooperation on Science, Technology and Humanities (P. R. Andjus and P. Battinelli Eds.), ISBN 978-86-7522-048-0, pp. 45-50, SIGRa star, Belgrade, 2015.

[B1] Pilloni A., Pisano A., Riera Guasp M., Puche Panadero R., Pineda Sanchez M. (2013). Fault Detection in Induction Motors. In: AC Electric Motors Control: Advanced Design Techniques and Applications. vol. 1, p. 275-309, Chichester, West Sussex, England:John Wiley and Sons, ISBN: 978-1-118-33152-1, doi:10.1002/9781118574263.ch14

### International conference proceedings

[C27] Pilloni A., Pisano A., Usai E., Y. Orlov (2024) "Boundary control of an uncertain heat process with unmatched disturbance and dynamic actuator". In: 2024 17th International Workshop on Variable Structure Systems (VSS) , Dubai, United Arab Emirates, Oct. 2024 (*under review*).

[C26] Pilloni A., Pisano A., Usai E. (2024) "Strict Lyapunov Functions for Second-Order Sliding Mode Robust Consensus with the Super-Twisting Algorithm". In: 2024 17th International Workshop on Variable Structure Systems (VSS), Dubai, United Arab Emirates, Oct. 2024 (*under review*).

[C25] Jerónimo José Moré, Diego Deplano, Alessandro Pilloni, Alessandro Pisano, Mauro Franceschelli, "Online Coordination of BESS and Thermostatically Control Loads for Shared Energy Optimization in Energy Communities" IEEE Conference on Automation Science and Engineering (CASE), Bari, Italy, 28 August 2024 (*under review*);

[C24] Pilloni A., Pisano A., Usai E. (2022) "A novel finite-time first-order sliding-mode unknown input observer with certain fixed-time convergence characteristics". In: 2022 16th International Workshop on Variable Structure Systems (VSS), Rio de Janeiro, Brazil, Sept. 2022.

[C23] Kaheni M., Pilloni A., Serra Ruda G., Usai E., Franceschelli M. (2022) "Distributed Asynchronous Greedy Control of Large Networks of Thermostatically Controlled Loads for Electric Demand Response", In: 61st IEEE Conference on Decision and Control (CDC 2022), Cancun, Mexico, Dec. 2022.

[C22] Pilloni A., Deplano D., Giua A., Usai E. (2021). A Sliding Mode Observer design for the Average State Estimation in Large-Scale Systems" In: 60th IEEE Conference on Decision and Control (CDC 2021), Austin, Texas (USA)-December 13th-17th 2021.

[C21] Pisano A., Orlov Y., Pilloni A., Usai E. (2019). Combined Backstepping/Second-Order Sliding-Mode Boundary Stabilization of an Unstable Reaction-Diffusion Process.", In: 58th IEEE Conference on Decision and Control (CDC 2019), Nice, France - December 11th-13th 2019.

- [C20] M. Franceschelli, A. Pilloni, A. Gasparri. "A heuristic approach for online distributed optimization of multi-agent networks of smart sockets and thermostatically controlled loads based on dynamic average consensus." In: Proceedings of the 16th European Control Conference (ECC 2018). p. 2541-2548, 345 E 47TH ST, NEW YORK, NY 10017 USA: IEEE, Limassol (Cyprus), June 12-15, 2018, doi: 10.23919/ECC.2018.8550337
- [C19] M. Gholami, A. Pilloni, A. Pisano, E. Usai. "On the robust distributed control of inverter-based microgrids". 5th International Conference IcETRAN, ISBN 978-1-4661-752-1, pp. 615-622. 2018.
- [C18] M. Gholami, A. Pilloni, A. Pisano, Z. A. Sanai Dashti, E. Usai. "Robust consensus-based secondary voltage restoration of inverter-based islanded microgrids with delayed communications". In: 2016 IEEE 55th Conference on Decision and Control, CDC 2016. p. 6952-6957, Institute of Electrical and Electronics Engineers Inc., New York, NY 10017 USA: Institute of Electrical and Electronics Engineers Inc., ISBN: 978-1-5386-1395-5, ISSN: 0743-1546, Centre of the Fontainebleau in Miami Beach, USA, 2018, doi: 10.1109/CDC.2018.8619774
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Conference on Decision and Control (CDC 2013). p. 2611-2616, Piscataway (NJ):IEEE, ISBN: 978-146735717-3, Florence, Italy, 10-13 Dicembre 2013, doi: 10.1109/CDC.2013.6760276

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#### **Abstracts at national conferences (Italy)**

[N8] A. Pilloni, A. Pisano, E. Usai (2022) A global finite-time first-order sliding mode strong observer design with certain semi-global fixed-time convergence characteristics. Convegni Nazionali SIDRA, Automatica.it, Cagliari, 1 – 3 Settembre 2022.

[N7] Y. Orlov, A. Pilloni, A. Pisano, E. Usai (2021) Boundary control of an uncertain diffusion PDE with dynamic actuator and unmatched disturbance. Convegni Nazionali SIDRA, Automatica.it, Catania, 9 – 10 Settembre 2021.

[N6] S. Koch, A. Pilloni, A. Pisano, E. Usai (2020) Robust Boundary Control of an In-Line Heating System governed by coupled PDE/ODE Dynamics. Convegni Nazionali SIDRA, Automatica.it, Cagliari, 9 – 11 Settembre 2020.

[N5] A. Pilloni, M. Franceschelli, A. Pisano, E. Usai (2019). Delta modulation ( $\Delta$ -M) via Second-order Sliding-Mode Control Technique. Convegni Nazionali SIDRA, Automatica.it, Ancona, 11 – 13 Settembre 2019.

[N4] A. Pilloni, M. Franceschelli, M. Gholami, A. Pisano, E. Usai (2018) Sliding mode robustification of networked controllers with application to distributed optimization and microgrid control. Convegni Nazionali SIDRA, Automatica.it, Firenze, 12-14 settembre 2018.

[N3] G. Fadda, A. Pilloni, A. Pisano, E. Usai, A. Marjanovic, S. Vujnovic (2015) A combined model-based data-driven approach for FDI in a water-steam power plant. Convegni Nazionali SIDRA, Automatica.it, Bari, 7-9 settembre 2015.

[N2] A. Pilloni, A. Pisano, E. Usai, J.A. Luna-Pacho, S. M. Rakhtala (2015) Controllo ed Osservazione dello Stato Robusta su Celle a Combustibile con Membrana a Scambio Protonico. Convegni Nazionali SIDRA, Automatica.it, Bari, 7-9 settembre 2015.

[N1] A. Pilloni, A. Pisano, E. Usai, M. Franceschelli, A. Giua (2013) Finite-Time Consensus of Perturbed Networks via Discontinuous Algorithms. Convegni Nazionali SIDRA, Automatica.it, Palermo, 16-18 settembre 2013.

#### **Professional experiences as Automation Engineer and Technical Consultant**

**2022 Dec 31-2022 Nov 25** Commissioner/client: SitAut SRL. Activity description: Analysis of methods for pressure regulation in pressurized water networks for water distribution in urban areas.

**2020 Jan 31-2019 Dec 10** Commissioner/client: SitAut SRL. Activity description: Development and testing on the Siemens S7-1200 PLC environment of the control and the JavaScript Web-Server interface for remote control of an experimental electro-hydraulic prototype designed to generate wave motion in a tank.

**2019 May 15-2019 Mar 1** Commissioner/client: Cooperative Society Infora. Activity description: Implementation in the MATLAB/Simulink environment of an electric smart microgrid accounting photovoltaic distributed generation and consensus-based frequency and voltage distributed control. The activity falls within the activity of the research project "ODIS-Optimization of Distributed systems in the Smart-city and smart-grid" coordinated by the University of Cagliari.

**2016 Jun 24-2016 May 13** Commissioner/client: SitAut SRL on behalf of Abinsula SRL. Activity description: Feasibility study for the integration of the IEC 61131-3-compliant CODESYS Development Environment on a proprietary FPGA-based embedded platform. The activity was commissioned by Abinsula SRL on behalf of TIERRA SPA, manufacturer of the mentioned embedded platform.

**2015 Oct 27-2015 Sep 15** Commissioner/client: SitAut SRL on behalf of Elianto CSP SRL. Activity description: Implementation on the Siemens S7-1200 PLC Development Environment of a high-level supervisory control system for the Thermodynamic Concentrated solar power plant sited in Ussana (Italy), and execution of related debugging tests. The activity was commissioned by Elianto CSP SRL owner of the power plant.

**2015 Oct 15-2015 Sep 5** Commissioner/client: Abinsula SRL. Activity description: Compliance analysis of the PLC open-source IDE BEREMIZ with the IEC 61131-3 standard and development of a demonstrator that attests to its stability and completeness for industrial control purposes. The demonstrator should also highlight the limitations and advantages of BEREMIZ compared to the well-known, but not open-source, IEC 61131-3-compliant IDE Codesys.

**2013 Jul 1-2013 Dec 1** Collaboration with SitAut SRL on behalf of Elianto CSP SRL. Activity description: Definition of the operating phases and implementation on a Siemens S7 1200 PLC of the communication, management, and control logics for a Thermodynamic Concentrated Solar Power plant to be integration into an existing 14MWe Biomass power plant. The activity was commissioned by Elianto CSP SRL, which had to integrate its CSP technology, for the first time, into already existing biomass power plant owned by Falk Renewable SpA and sited at Rende (Italy). More info: <https://www.borsaitaliana.it/borsa/notizie/price-sensitive/download/144946.html>.