CURRICULUM VITAE OF ANTONIO RUSSO

CURRENT POSITION

Associate Professor in Automation (Settore Scientifico Disciplinare IINF-04/A - Automatica), at Università degli Studi di Bergamo, Dipartimento di Ingegneria Gestionale, dell'Informazione e della Produzione, 24044 Dalmine, Bergamo, Italy.
email: antonio.russo@unibg.it

ACADEMIC AND RESEARCH EMPLOYMENT

Past Positions

Università degli Studi di Bergamo   Mar. 2025 - present
Dipartimento di Ingegneria Gestionale, dell'Informazione e della Produzione   (Associate Professor)

Università degli Studi della Campania   Jan. 2022 - Feb. 2025
Dipartimento di Ingegneria   (Assistant Professor, RTD-A)
TOPIC: Automatic Power Management techniques for More Electric Aircraft

Università degli Studi della Campania   May 2021 - Dec. 2021
Dipartimento di Ingegneria   (Research Fellow, Assegno di Ricerca)
TOPIC: Sviluppo di algoritmi di controllo non lineari per la manipolazione robotica

Università degli Studi della Campania   Nov. 2020 - May 2021
Dipartimento di Ingegneria   (Research Fellow, Borsa di Ricerca)
TOPIC: Studio di algoritmi di controllo predittivo per l'interazione uomo-robot

Università degli Studi della Campania   Nov. 2017 - Oct. 2020
Dipartimento di Ingegneria   (PhD Student)
TOPIC: Sliding Mode Control, Switched Systems, More Electric Aircraft

Education

PhD, Industrial and Information Engineering   13th Jan. 2021
Università degli Studi della Campania
THESIS: Advances in Sliding Mode Control and Switched Systems Theory for More Electric Aircraft
ADVISOR: Prof. Alberto Cavallo

Master of Science, Computer Science Engineering (110/110 cum laude)   17th Jul. 2017
Università degli Studi della Campania
THESIS: Nonlinear Filtering Techniques for Spacecraft Position and Attitude Estimation
ADVISOR: Prof. Alberto Cavallo

Bachelor of Science, Electronic and Computer Science Engineering (110/110)   25th Nov. 2015
Seconda Università degli Studi di Napoli
THESIS: Simulation of Mobile Robot Navigation Algorithms using MATLAB Robotics System Toolbox
ADVISOR: Prof. Ciro Natale

Visiting Appointments

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)   *Jul. 2024 - Oct. 2024*
Centro Internacional Franco-Argentino de Ciencias de la Información y de Sistemas   (Visiting Researcher)
TOPIC: Stabilization of switched affine linear systems through polytopic Lyapunov functions
SUPERVISOR: Prof. Hernán Haimovich

University of Illinois at Urbana-Champaign   *Jan. 2019 - Jun. 2019*
Coordinated Science Laboratory   *(Visiting PhD Student)*
TOPIC: Integral-input-to-state stability of switched nonlinear systems under slow switching
SUPERVISOR: Prof. Daniel Liberzon

ACTIVITIES

Research activity and major scientific achievements

He has authored or co-authored 12 papers published on international journals, 1 book chapter, and 15 papers published on the proceedings of international conferences. His research is mainly in the area of sliding mode control, stability of switched, impulsive and hybrid systems with application to innovative power management techniques for more electric aircraft. Furthermore, recent research on visual servoing algorithms is ongoing.

Switched, Impulsive and Hybrid systems stability   *2019-onwards*
CONTRIBUTION: He has contributed to the definition of sufficient conditions on dwell-time of the switching signal that guarantee integral Input-to-State stability (iISS) of nonlinear switching systems with jumps. This result involves the definition of weaker variants of the iISS property. Furthermore, he has proved that, similarly to the case of continuous time systems, the equivalence between 0-input Global Asymptotic Stability (0-GAS) plus Uniformly Bounded Energy Bounded (UBEBS) and iISS also holds for hybrid nonlinear systems. Finally, he his currently working on the definition of dwell-time switching strategies to practically stabilize switched affine linear systems with cost guarantee.

Sliding Mode Control   *2020-onwards*
CONTRIBUTION: He has contributed to the design of a novel nonlinear control scheme comprising of a Higher-Order Sliding Mode (HOSM) controller equipped with a novel mechanism to encounter the saturation limits named Bounded-Integral-Control (BIC) to solve the problem of robust control in finite time of uncertain continuous-time nonlinear systems affine in the control variable with saturation constraints.

Power Management for More Electric Aircraft   *2018-onwards*
CONTRIBUTION: He has contributed to the design of nonlinear control algorithms applied to the control of DC/DC power converters aimed at managing electrical power onboard the so-called More Electric Aircraft. Specifically, such DC/DC converters are connected to auxiliary energy storage systems such as batteries and supercapacitors to implement advanced power management techniques. Examples of such power management strategies are: avoiding the aircraft main generator overload by exploiting auxiliary batteries or reducing the mechanical stress on the aircraft generator through adoption of supercapacitors.

Visual Servoing   *2021-onwards*
CONTRIBUTION: He contributed to the visual servoing research by introducing a novel sampled-data model of the feature dynamics, which, in contrast with the usual forward Euler approximation, retains the rigid motion constraint. Using such model, conditions on the stability of the equilibrium points of the visual servoing system were carried out. Moreover, as further contribution, he has designed a novel feature generation method based on the homography provided by a template matching algorithm based on the Zero mean Normalized Cross Correlation (ZNCC) and the design of a visual tracking scheme by resorting to the Extended Kalman Filter (EKF) and Lyapunov direct method, which explicitly takes into account the camera velocity limits, while ensuring stability.

Bibliometric profiles
- *Scopus:* `https://www.scopus.com/authid/detail.uri?authorId=57210922248`
- *Google Scholar:* `https://scholar.google.com/citations?user=W8nj-3QAAAAJ&hl=it`
- *Web of Science:* `https://www.webofscience.com/wos/author/record/AAH-2925-2021`

Editorial Activities

Associate Editor   *Jul. 2022 - present*
Member of the Editorial Board
JOURNAL: Franklin Open

Associate Editor   *Feb. 2022 - present*
Conference Editorial Board of European Control Association (EUCA)
CONFERENCE: European Control Conference (ECC)

Guest Editor   *Feb. 2022*
JOURNAL: Energies
SPECIAL ISSUE: Advanced Control Strategies for Electric Power Management

Participation to Committees

Technical Committee Member   *Nov. 2022 - present*
International Conference on Mechatronics, Robotics and Automation

Member   *Sept. 2023 - present*
IFAC Technical Committee 6.3 (Power and energy systems)

Teaching

Course	Role	Academic Year	h/year	Years
Fundamentals of Control Systems	Lecturer	2024/25	48	1
Control System Technology	Lecturer	2024/25	48	1
Data Science in Medicine	Lecturer	2024/25	24	1
Robust Control	Lecturer	2021/22–2023/24	24	3
Identificazione e Controllo dei Processi	Lecturer	2022/23–2024/25	24	3

Student advising and co-advising

Sajjad Miralizadeh Jalalat, Ph.D. student   *Nov. 2023 - onwards*
Università degli Studi della Campania   *(co-advisor)*
TOPIC: Modelling, control and optimisation of electrical smart grids
ADVISOR: Prof. Alberto Cavallo

Francesco Tucci, Ph.D. student   *Nov. 2024 - onwards*
Università degli Studi della Campania   *(co-advisor)*
TOPIC: Smart control and optimization of electrical smart grids
ADVISOR: Prof. Alberto Cavallo

Advisor for 12 Master's students thesis projects   *Oct. 2020 - onwards*
Università degli Studi della Campania

Qualifications

Abilitazione Scientifica Nazionale (ASN), Fascia II   *20nd Nov. 2023 – 20nd Nov. 2034*
SECTION: 09/IINF-04 - Automatica (previously 09/G1)
TITLE: Italian national scientific qualification as associate professor
ISSUED BY: Italian Ministry of University and Research (MUR)

License, Information Engineering   *Feb. 2021*
TITLE: Professional practice license as information engineer
ISSUED BY: Ordine degli Ingegneri di Caserta, Italy

Participation to Research Projects

PROJECT NAME: Advanced Control and Optimization Techniques for Aeronautic Power Management
FUNDING AGENCY: Università degli Studi della Campania
PERIOD: Sept. 2023 - Apr. 2024
DESCRIPTION: analyzing, designing and implementing advanced power management techniques aimed at optimally managing the power distribution on-board future More Electric Aircraft while fully exploiting the power capabilities provided by batteries and supercapacitors installed on-board the aircraft in order to avoid possible generator overload scenarios.
ROLE: Principal Investigator

PROJECT NAME: Hybrid ElectriC regional Aircraft distribution TEchnologies
FUNDING AGENCY: Clean Aviation
PERIOD: Jan. 2023 - Dic. 2025
DESCRIPTION: this project will address the associated challenges of system weight and power density, high voltage challenges with lightning, arcing and electromagnetic interference as well as optimized thermal management, in addition to digitizing the design process with digital twins. This will lead to transformative technology bricks, which are holistically optimized at system integration architecture level.
ROLE: Project Member

PROJECT NAME: JTI-CS2-2019-CfP10-SYS-02-59 HYPNOTIC
FUNDING AGENCY: CleanSky2
PERIOD: May 2020 - Mar. 2023
DESCRIPTION: design of a set of bidirectional converters, acting together as only one equipment able to reconfigure itself as a consequence of load/source variations and as a reaction to a fault or to other undesirable events. Coordinated by Skylife Engineering (ESP) and with participants IRT Antoine de Saint Exupery (FRA), Università degli Studi della Campania "Luigi Vanvitelli" (ITA) and Aeromechs SRL (ITA). Topic Manager: Airbus (FRA).
ROLE: Project Member

PROJECT NAME: JTI-CS2-2017-CFP06-REG-01-10 ENIGMA
FUNDING AGENCY: CleanSky2
PERIOD: Apr. 2018 - Mar. 2021
DESCRIPTION: design of a Centralized Smart Supervisory controller to obtain the formulation for the Enhanced Electrical Energy Management control logics. Coordinated by United Technologies Research Centre Ireland (IRL) and with participants University of Nottingham (UK), Università degli Studi della Campania "Luigi Vanvitelli" (ITA) and Aeromechs SRL (ITA). Topic Manager: Leonardo (ITA).
ROLE: Project Member

PROJECT NAME: JTI-CS2-2016-CFP04-REG-01-08 ESTEEM

Invited Talks

Stabilization of Switched Affine Systems With Dwell-Time Constraint   *Sept. 2024*
Centro Internacional Franco-Argentino de Ciencias de la Información y de Sistemas

On Stability of Switched and Hybrid Systems   *Jun. 2024*
Università degli studi di Bergamo, Dipartimento di Ingegneria Gestionale, dell'Informazione e della Produzione

Characterizations of integral input-to-state stability for switched and hybrid systems   *Jun. 2023*
Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria

Reviewing experience

Number of reviews for each journal
- *Automatica: 9, Transactions on Systems, Man and Cybernetics: Systems: 8, Transactions on Automatic Control: 5, International Journal of Control: 4, International Journal of Robust and Nonlinear Control: 3, Control Systems Letters: 3, Nonlinear Analysis: Hybrid Systems: 3, Optimal Control, Applications and Methods: 2*

PUBLICATIONS

International Journals

[J.1]   G. Canciello, A. Russo, and A. Cavallo. "A consensus-based current sharing algorithm for energy storage systems: an application to aeronautic microgrids". In: *IEEE Access* (2024), pp. 1–1.

[J.2]   M. Costanzo, G. De Maria, C. Natale, and A. Russo. "Modeling and Control of Sampled-Data Image-Based Visual Servoing With Three-Dimensional Features". In: *IEEE Transactions on Control Systems Technology* 32.1 (2024), pp. 31–46.

[J.3]   S. Liu and A. Russo. "Further characterizations of integral input-to-state stability for hybrid systems". In: *Automatica* 163 (2024), p. 111484.

[J.4]   A. Russo and A. Cavallo. "Stability and Control for Buck-Boost Converter for Aeronautic Power Management". In: *Energies* 16.2 (2023).

[J.5]   A. Russo, G. P. Incremona, R. Seeber, and A. Ferrara. "Adaptive Bounded Integral Control With Enhanced Anti-Windup Design". In: *IEEE Control Systems Letters* 7 (2023), pp. 1861–1866.

[J.6]   M. Costanzo, G. De Maria, C. Natale, and A. Russo. "Stability and Convergence Analysis of 3D Feature-Based Visual Servoing". In: *IEEE Robotics and Automation Letters* 7.4 (2022), pp. 12022–12029.

[J.7]   S. Liu, A. Russo, D. Liberzon, and A. Cavallo. "Integral-Input-to-State Stability of Switched Nonlinear Systems Under Slow Switching". In: *IEEE Transactions on Automatic Control* 67.11 (2022), pp. 5841–5855.

[J.8]   A. Russo, G. P. Incremona, and A. Cavallo. "Higher-Order Sliding Mode design with Bounded Integral Control generation". In: *Automatica* 143 (2022), p. 110430.

[J.9]   S. Sumsurooah, Y. He, M. Torchio, K. Kouramas, B. Guida, F. Cuomo, J. Atkin, S. Bozhko, A. Renzetti, A. Russo, S. Riverso, and A. Cavallo. "ENIGMA–A Centralised Supervisory Controller for Enhanced Onboard Electrical Energy Management with Model in the Loop Demonstration". In: *Energies* 14.17 (2021).

[J.10] G. Canciello, A. Cavallo, A. Lo Schiavo, and A. Russo. "Multi-objective adaptive sliding manifold control for More Electric Aircraft". In: *ISA Transactions* (2020).

[J.11] A. Cavallo, G. Canciello, and A. Russo. "Integrated supervised adaptive control for the More Electric Aircraft". In: *Automatica* 117 (2020).

[J.12] A. Cavallo, A. Russo, and G. Canciello. "Hierarchical control for generator and battery in the More Electric Aircraft". In: *Science China Information Sciences* 62.9 (2019).

Book chapters

[B.1]   A. Russo, B. Guida, G. Canciello, and A. Cavallo. "13 - Energy system management for aeronautic and aerospace applications: Demonstration and study cases". In: *Hybrid Technologies for Power Generation.* Ed. by M. Lo Faro, O. Barbera, and G. Giacoppo. Hybrid Energy Systems. Academic Press, 2022, pp. 373–418.

International conferences proceedings

[C.1]   Felipe Cinto, Alexis J. Vallarella, Antonio Russo, Gian Paolo Incremona, and Hernan Haimovich. "Polytopic Lyapunov Functions are not Straightforward for Minimum Dwell-Time Switched Affine Systems". In: *2024 IEEE 63rd Conference on Decision and Control (CDC).* 2024, pp. 7098–7103.

[C.2]   M. Costanzo, G. De Maria, C. Natale, and A. Russo. "3D Feature-Based Sampled-Data Visual Tracking". In: vol. 56. 2. 22nd IFAC World Congress. 2023, pp. 10768–10773.

[C.3]   A. Russo and S. Liu. "Do 0-GAS-Guaranteeing Impulse Sequences Preserve ISS or iISS Properties? Not Always". In: *2023 62nd IEEE Conference on Decision and Control (CDC).* 2023, pp. 7655–7660.

[C.4]   A. Russo, M. Costanzo, and A. Cavallo. "Combined Supercapacitor and Battery Sliding Mode Control for Aeronautic Application". In: *2022 5th International Conference on Mechatronics, Robotics and Automation (ICMRA).* 2022, pp. 64–68.

[C.5]   A. Russo, G. P. Incremona, and A. Cavallo. "A Saturated Higher Order Sliding Mode Control Approach for DC/DC Converters". In: *2022 IEEE 17th International Conference on Control & Automation (ICCA).* 2022, pp. 44–49.

[C.6]   A. Russo, G. P. Incremona, A. Cavallo, and P. Colaneri. "State Dependent Switching Control of Affine Linear Systems With Dwell Time: Application to Power Converters". In: *2022 American Control Conference (ACC).* 2022, pp. 3807–3813.

[C.7]   A. Russo, G. Canciello, and A. Cavallo. "Generalized Super-Twisting control of a Dual Active Bridge for More Electric Aircraft". In: *2021 European Control Conference, ECC 2021.* Vol. 2021-June. 2021.

[C.8]   A. Russo, G. Canciello, and A. Cavallo. "MIL-Standards Verification of Battery Control for More Electric Aircraft Application". In: vol. 1828. 1. IOP Publishing, Feb. 2021, p. 012057.

[C.9]   A. Russo, G. Canciello, and A. Cavallo. "MPC based Sliding Mode Control for More Electric Aircraft application". In: *2021 International Conference on Industrial Technology, ICIT 2021.* Vol. 2021-March. 2021.

[C.10] G. Zappulla Sathler, B. Cougo, A. L. Rodriguez Vazquez, A. Russo, and B. Guida. "Optimization of Bidirectional Modular DC/DC Converter for Low and High Power Operation in Aircraft Applications". In: *2021 International Conference on Industrial Technology, ICIT 2021.* Vol. 2021-March. 2021.

[C.11]   A. Russo and A. Cavallo. "Supercapacitor stability and control for More Electric Aircraft application". In: *2020 European Control Conference (ECC)*. 2020, pp. 1909–1914.

[C.12]   A. Russo, S. Liu, D. Liberzon, and A. Cavallo. "Quasi-Integral-Input-to-State Stability for Switched Nonlinear Systems". In: vol. 53. 2. 21st IFAC World Congress. 2020, pp. 1992–1997.

[C.13]   A. Cavallo, G. Canciello, and A. Russo. "Buck-Boost Converter Control for Constant Power Loads in Aeronautical Applications". In: *Proceedings of the IEEE Conference on Decision and Control*. Vol. 2018-December. 2019, pp. 6741–6747.

[C.14]   A. Cavallo, A. Russo, and G. Canciello. "Control of supercapacitors for smooth EMA operations in aeronautical applications". In: *Proceedings of the American Control Conference*. Vol. 2019-July. 2019, pp. 4948–4954.

[C.15]   G. Canciello, A. Russo, B. Guida, and A. Cavallo. "Supervisory Control for Energy Storage System Onboard Aircraft". In: *2018 IEEE International Conference on Environment and Electrical Engineering and 2018 IEEE Industrial and Commercial Power Systems Europe (EEEIC / I&CPS Europe)*. 2018, pp. 1–6.

[C.16]   A. Cavallo, G. Canciello, and A. Russo. "Supervised Energy Management in Advanced Aircraft Applications". In: *2018 European Control Conference, ECC 2018*. 2018, pp. 2769–2774.

Submitted papers

[S.1]   F. Cinto, A. J. Vallarella, A. Russo, and H. Haimovich. *Determining Invariance of Convex Sets via Approximate Solutions*. IEEE Conference on Decision and Control, Submitted. 2025.

[S.2]   S. Liu and A. Russo. *On the implication from 0-input global uniform asymptotic stability to integral-input-to-state stability*. IEEE Conference on Decision and Control, Submitted. 2025.

[S.3]   S. Miralizadeh Jalalat, A. Cavallo, A. Russo, and F. Tucci. *Learning-based detection of fault type and location in distributed microgrids*. Smart Energy Systems for efficient and sustainable smart grids and smart cities, Submitted. 2025.

[S.4]   S. Miralizadeh Jalalat, A. Russo, F. Tucci, and A. Cavallo. *Distributed Stability-Guaranteed Reinforcement Learning-based Control for Microgrid Voltage Regulation*. IEEE Conference on Decision and Control, Submitted. 2025.

[S.5]   F. Cinto, A. J. Vallarella, A. Russo, and H. Haimovich. *On invariance of polytopic sets under dwell time switching*. Submitted to SIAM Journal on Control and Optimization, Under Review. 2024.

[S.6]   S. Liu and A. Russo. *On Variants of (Integral) Input-to-State Stability for Hybrid Systems and Applications to Uniting Control*. Submitted to IEEE Transactions on Automatic Control, Under Review. 2024.

[S.7]   A. Russo, G.P. Incremona, and P. Colaneri. *Stabilization of Switched Affine Systems With Dwell-Time Constraint*. Submitted to IEEE Transactions on Automatic Control, Under Review. 2024.

Prof. Antonio Russo
Bergamo, March 4, 2025