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## CALL FOR PAPERS - SPECIAL SESSION
## "Nonlinear Control Strategies for Robotic Systems"
### for CODIT 2026
### July 13-16, 2026 ▪ Bari, Italy

**Session Co-Chairs:**

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**Session description:**

This special session deals with the problem of addressing current challenges and recent developments in nonlinear control for robotic systems. As robots are increasingly required to perform complex tasks in dynamic and unpredictable environments, the need for sophisticated control strategies capable of handling nonlinearities in both system dynamics and external disturbances becomes crucial. This includes a wide range of platforms such as ground robots, manipulators, mobile robots, unmanned aerial vehicles (UAVs), and soft robotic systems. The session aims to explore the latest research, novel techniques, and practical applications of nonlinear control methods in robotics, with a focus on improving robustness, stability, and performance in real-world scenarios. Topics of interest include, but are not limited to, model identification of robotic systems, kinematic and dynamic control, cooperative and multi-agent control, and the integration of nonlinear controllers into heterogeneous robotic platforms. Contributions from both theoretical studies and experimental applications are encouraged, particularly those demonstrating how nonlinear control methods enhance the capabilities of robotic systems in areas such as industrial automation, mobile robotics, aerial robotics, and soft robotics.

The goal is to bring together researchers, engineers, and practitioners from academia and industry to share insights, discuss open challenges, and propose innovative solutions related to nonlinear control techniques for robotic systems. By fostering collaboration and knowledge exchange, this special session aims to advance the development and practical deployment of nonlinear control strategies that enhance the performance, robustness, and stability of a wide range of robotic platforms, including manipulators, mobile robots, unmanned aerial vehicles (UAVs), and soft robotic systems, operating in complex real-world environments. Attendees will have the opportunity to explore state-of-the-art theoretical advances as well as experimental and application-driven studies that address the evolving needs of diverse robotic systems across multiple industries and application domains.

The topics of interest include, but are not limited to:

- Nonlinear control design and synthesis for robotic systems
- Identification of modelling parameters of robotic systems
- Adaptive and robust control techniques for uncertain and nonlinear Dynamics
- Feedback linearization and backstepping control methods
- Lyapunov-based methods for stability and control in robotics
- Cooperative and multi-agent systems with nonlinear control
- Nonlinear control of mobile and aerial robots
- Nonlinear control applications in industrial robots, medical robots and autonomous vehicles
- Nonlinear control strategies for robot sensing and decision making
- Nonlinear control of soft robots and continuous manipulators
- Nonlinear control of unmanned aerial vehicles (UAVs) under aerodynamic uncertainties and external disturbances
- Nonlinear flight control and stabilization of multirotor and fixed-wing UAVs
- Nonlinear trajectory tracking and guidance control for UAV systems
- Formation control and cooperative nonlinear control of multi-UAV systems
- Fault-tolerant and resilient nonlinear control strategies for UAV platforms
- Nonlinear control approaches for UAV navigation, localization, and perception
- Energy-efficient and performance-oriented nonlinear control of UAVs