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CICLO DI SEMINARI DI AUTOMATICA E ROBOTICA

📍 AULA MAGNA
DIPARTIMENTO DI INGEGNERIA

PLANNING UNDER UNCERTAINTIES: CLOSED-LOOP SENSITIVITY IN ROBOTIC APPLICATIONS

19/12/2024, ore 16:00

Speaker

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Abstract

Addressing uncertainties is a key challenge in robotics, particularly as robotic systems are increasingly deployed in complex real-world scenarios. Uncertainties in robot dynamics, sensor noise, and environmental conditions can significantly impact planned trajectories, jeopardizing task execution. This seminar explores recent advancements in robust motion planning, focusing on the concept of closed-loop state sensitivity — a powerful tool for assessing how variations in model parameters impact system behavior under feedback control. The seminar will cover innovative methods for shaping system trajectories to enhance robustness by minimizing sensitivity. Following this, the concept of uncertainty tubes will be introduced, with an emphasis on their mathematical foundation and effectiveness in constraining deviations from planned trajectories. These approaches have been validated and tested on various robotic platforms, demonstrating their practical applicability and reliability in real-world scenarios.