UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

Seminar announcement

Wednesday 26 May 2021, Time: 14:00 - 16:00
MS Teams - code: ra1hfo6

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INTRODUCTION TO LEGGED ROBOTS AND EXAMPLES OF IIT'S DYNAMIC LEGGED SYSTEMS LAB

Abstract: The idea of building walking machines has fascinated humans for centuries. In this seminar, Claudio Semini and Michele Focchi will give an introduction to legged robots and show examples of their own research results. In our journey through the world of legged robots, we will cover the history of legged robots, their advantage when compared to wheeled robots, bio-inspiration, introduce some specific taxonomy and terminology, describe applications, robot design and basic principles for modelling and control, followed by various examples of the quadruped robots developed by IIT's Dynamic Legged Systems lab.

Lecturers short bio:

- **Dr. Claudio Semini** (MSc 2005, PhD 2010) is the head of the Dynamic Legged Systems (DLS) lab (dls.iit.it) at Istituto Italiano di Tecnologia (IIT) that developed a number of high-performance hydraulic robots, including HyQ, HyQ2Max, and HyQReal. He holds an MSc degree from ETH Zurich in electrical engineering and information technology. He spent 2 years in Tokyo for his research: MSc thesis at the Hirose Lab at Tokyo Tech and staff engineer at the Toshiba R&D center in Kawasaki working on mobile service robotics. During his PhD and subsequent PostDoc at IIT, he developed the quadruped robot HyQ and worked on its control. Since 2012 he leads the DLS lab. Claudio Semini is the author and co-author of more than 100 peer-reviewed publications in international journals and conferences. He is also a co-

founder of the Technical Committee on Mechanisms and Design of the IEEE-RAS Society. He is/was the coordinator/partner of several EU-, National and Industrial projects (including HyQ-REAL, INAIL Teleop, Moog@IIT joint lab, VINUM, etc). His research interests include the design and control of highly dynamic and versatile legged robots for field application in real-world operations, locomotion, agricultural robotics, and others.

- **Dr. Michele Focchi** is currently a Researcher at the DLS team in IIT. He received both the Bsc. and the Msc. in Control System Engineering from Politecnico di Milano. After gaining some R&D experience in the industry, in 2009 he joined IIT where he developed a micro-turbine for which he obtained an international patent and a prize. In 2013, he got a PhD in robotics, getting involved in the Hydraulically Actuated Quadruped Robot (HyQ) project. He initially was developing torque controllers for locomotion purposes, subsequently he moved to higher level (whole-body) controllers and model identification. He was also investigating locomotion strategies that are robust to uncertainties an work reliably on the real platform. Currently his research interests are focused on pushing the performances of quadruped robots in traversing unstructured environments, by using optimization-based planning strategies to perform dynamic motion planning. He published more than 35 papers in international journals and conferences and supervised several master and PhD thesis.

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