IT Talks

A SEMINAR SERIES FOR PHD STUDENTS IN INFORMATION TECHNOLOGY

Presentation 1
***Mattia Alborghetti*: Harmonic Methods for Optimization and Control of Airborne Wind Energy Systems**
Airborne Wind Energy Systems (AWES) are tethered aerial vehicles that harvest wind energy by flying at high speed in crosswind conditions. Reaching fully autonomous, high-performance flight remains a key milestone toward improving the technology readiness level and enabling real-world deployment. This research exploits the periodic nature of crosswind power production to develop harmonic-based methods for both trajectory optimization and control. Optimal power-generating trajectories are computed by efficiently solving the underlying non-linear problem through pseudo-spectral (harmonic balance) methods, targeting maximum harvested power while reducing cycle-to-cycle power fluctuations. Building on this periodic structure, cyclic flight and turbine controllers are designed and validated in closed-loop simulation to reject periodic disturbances, achieving crosswind operation without relying on strict path-following strategies.

Presentation 2
***Matteo Rubino*: Tyre-Aware Estimation Methods for Vehicle Dynamics Control**
The performance of vehicle dynamics control systems relies on accurate information about tyre–road interaction. However, the quantities describing this interaction are often difficult to measure directly and vary with operating conditions, tyre state, and road characteristics. This research develops model-based and data-driven methods for tyre parameters and grip estimation, as well as fault detection in tyre pressure and temperature measurements. The proposed methods are evaluated through experimental data and simulation studies, assessing their ability to provide reliable and timely information for vehicle control and enhance awareness of tyre–road interaction limits.

Pitch
Federico Bordini.

The event will open with a networking reception.

14th October
11:30 am - 1:00 pm
New Conference Hall, Building 20A

POLITECNICO MILANO 1863 | DEPARTMENT OF ELECTRONICS INFORMATION AND BIOENGINEERING