Seminar

Control of Underwater Vehicles: From Design to Real-Time Experiments

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Summary of the talk

Underwater vehicles have gained an increased interest in the last decades given the multiple tasks they can accomplish in various fields such as dams' inspection, oil and gas industry, and environmental investigations. One of the potential applications of these systems deals with underwater inspection of facilities such as bridges, hydraulic dams, boat hulls, aquatic environments, etc. When we are interested in autonomous control of Remotely Operated Vehicles (ROVs), different challenges may arise. These challenges are mainly due to the inherent high nonlinearities and time varying behavior of their dynamics subject to hydrodynamic effects and external disturbances.

In order to avoid the degradation in the performance of the controlled system during a specific mission, the vehicle is expected to possess a self tuning ability and a certain robustness to compensate for different kinds of uncertainties, parameters' variation and external disturbances. That is why adaptive and robust controllers are very popular for such systems.

The heart of this talk deals with some advanced robust and adaptive control schemes applied to different underwater vehicles. The first experiments to validate the proposed controllers have been carried out in a swimming pool. To go further, some experiments in real conditions in the Mediterranean Sea will be presented and discussed.

Short Biography: Ahmed CHEMORI received his M.Sc. and Ph.D. degrees, respectively in 2001 and 2005, both in automatic control from the Grenoble Institute of Technology in France. He has been a post-doctoral fellow with the automatic control laboratory of Grenoble in 2006. He is currently a tenured research scientist in Automatic control and Robotics at the Montpellier Laboratory of Computer Science, Robotics, and Microelectronics (LIRMM). His research interests include nonlinear, adaptive and predictive control and their applications in underwater vehicles, parallel robots, underactuated mechanical systems, humanoid robots and exoskeletons.