

2015 SIDRA PhD Summer School on Robot Control

Bertinoro (FO), July 13-15, 2015
www.automatica.it/dottorato_scuole.htm

Coordinator

Alessandro De Luca (Sapienza Università di Roma)

Lecturers

François Chaumette (IRISA-INRIA, Rennes)
Antonio Franchi (LAAS-CNRS, Toulouse)
Claudio Melchiorri (Università di Bologna)
Cristian Secchi (Università di Modena e Reggio Emilia)
Luigi Villani (Università di Napoli Federico II)
Pierre-Brice Wieber (INRIA, Grenoble)

School objectives

The School aims at covering a selected number of topics on the control of robotic systems, which have attracted much attention in the last years both for research and in applications. The emphasis of the lectures will be on the methodological treatment, from basics to latest developments. Indeed, also relevant case studies will be highlighted.

The last SIDRA PhD School on [Robotics](#) has devoted to the subject a full week back in 2010. Since then, some robot control methods have reached a reasonable maturity while new control paradigms and issues have emerged. In particular, in this half week you will learn directly from top researchers in their respective fields:

- what is needed in order to realize optimal biped gaits and to control the walking locomotion of humanoid robots in a stable way;
- how exchanged forces and relative motion are safely regulated during physical human-robot interaction or in contact with dynamic environments;
- which kinesthetic control issues have to be addressed in robot tele-operation, in particular due to communication delays;
- why passivity control and algebraic graph theory play a role in synchronizing and coordinating teams of multiple autonomous robots;
- the benefits and challenges of controlling the motion of manipulators and mobile robots using image-based visual servoing.

It is assumed that the audience of PhD students has already an elementary knowledge of kinematics, dynamics, and simple control laws for robots, as acquired in a basic Robotics course inside an Automatic Control curriculum.

Teaching style and materials

The PhD School will be taught in English. According to the spirit of the latest editions, the teaching style of the lectures will be a traditional one, making use as much as possible of the blackboard for derivations, complemented as appropriate by videos, simulations, and diagrams. The speakers will provide a collection of handouts as material supporting the lectures. This material will be available at least one week before the start of the School.

Program

Day 1 – Monday, July 13, 2015		
9:00 – 10:30	Control of humanoid locomotion	Pierre-Brice Wieber
<i>coffee break</i>		
11:00 – 12:30	Control of humanoid locomotion	Pierre-Brice Wieber
<i>lunch</i>		
15:00 – 16:30	Control of physical robot interaction	Luigi Villani
<i>coffee break</i>		
17:00 – 18:30	Control of physical robot interaction	Luigi Villani
Day 2 – Tuesday, July 14, 2015		
9:00 – 10:30	Tele-operated control of robots	Claudio Melchiorri, Cristian Secchi
<i>coffee break</i>		
11:00 – 12:30	Tele-operated control of robots	Claudio Melchiorri, Cristian Secchi
<i>lunch</i>		
15:00 – 16:30	Control of multiple robots via passivity and graph theory	Antonio Franchi, Cristian Secchi
<i>coffee break</i>		
17:00 – 18:30	Control of multiple robots via passivity and graph theory	Antonio Franchi, Cristian Secchi
Day 3 – Wednesday, July 15, 2015		
<i>free morning</i>		
15:00 – 16:30	Visual servoing	François Chaumette
<i>coffee break</i>		
17:00 – 18:30	Visual servoing	François Chaumette

Contacts

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