European Embedded Control Institute

www.eeci-institute.eu/IGSC2015

International Graduate School on Control

Independent Graduate Modules– one 21 hours module per week **(3 ECTS)**

Different LOCATIONS

Deadline for advance registration to each module: 20/12/2014

M1 – PARIS-SACLAY 19/01/2015 – 23/01/2015	***Advanced topics in the optimal control of economic systems***	**Raouf Boucekkine,** *GREQAM, Aix-Marseille School of Economics, France*
M2 – PARIS-SACLAY 26/01/2015 – 30/01/2015	***Moments, positive polynomials and LMIs for optimal control***	**Didier Henrion & Jean-Bernard Lasserre** *CNRS LAAS, University of Toulouse, France*
M3 – PARIS-SACLAY 02/02/2015 – 06/02/2015	***The scenario approach for robust control, identification, and machine learning***	**Marco C. Campi,** *University of Brescia, Italy* **& Simone Garatti,** *Politecnico di Milano , Italy*
M4 – PARIS-SACLAY 16/02/2015 – 20/02/2015	***Control-oriented modeling and system identification***	**Emmanuel Witrant**, *University Joseph Fourier, GIPSA, Grenoble, France*
M5 – PARIS-SACLAY 23/02/2015 – 27/02/2015	***Decentralized and distributed control***	**Giancarlo Ferrari-Trecate,** *University of Pavia* **& Marcello Farina,** *Politecnico di Milano, Italy*
M6 – PARIS-SACLAY 02/03/2015 – 06/03/2015	***Model Predictive Control***	**Eduardo F. Camacho,** *University of Sevilla, Spain*
M7 – STUTTGART 02/03/2015 – 06/03/2015	***Randomized algorithms for systems, control and networks***	**Roberto Tempo & Fabrizio Dabbene** *CNR-IEIIT, Politecnico di Torino, Italy*
M8 – ISTANBUL 09/03/2015 – 13/03/2015	***Introduction to nonlinear systems analysis and nonlinear feedback control***	**Hassan K. Khalil,** *Michigan State University, USA*
M9 – BERLIN 23/03/2015 – 27/03/2015	***Nonlinear control for physical systems***	**Roger W. Brockett,** *Harvard SEAS, USA* **& Alexandre L. Fradkov,** *RAS, St-Petersburg, Russia*
M10 – BELGRADE 23/03/2015 – 27/03/2015	***Extremum seeking***	**Miroslav Krstic,** *Univ. California, San Diego, USA*
M11 – PARIS-SACLAY 23/03/2015 – 27/03/2015	***Feedback control of quantum systems***	**Pierre Rouchon,** *Mines-ParisTech, France* **& Alain Sarlette,** *Ghent University, Belgium*
M12 – PARIS-SACLAY 30/03/2015 – 03/04/2015	***Local methods for nonlinear systems and control***	**Rodolphe Sepulchre,** *Univ. of Cambridge, UK*
M13 – PARIS-SACLAY 06/04/2015 – 11/04/2015	***Sliding mode control and observation***	**Christopher Edwards,** *Univ. of Exeter, UK*
M14 – PARIS-SACLAY 13/04/2015 – 18/04/2015	***Attractive ellipsoid method in robust nonlinear control***	**Alexander Poznyak**, *CINVESTAV-IPN, Mexico*
M15 – ISTANBUL 13/04/2015 – 18/04/2015	***Advances in feedback design for MIMO nonlinear systems***	**Alberto Isidori,** *University of Rome "La Sapienza", Italy*
M16 – ST PETERSBURG 20/04/2015 – 25/04/2015	***Time-delay systems: Lyapunov functional and matrices***	**Vladimir Kharitonov,** *St.-Petersburg State University, Russia*
M17 – GRENOBLE 27/04/2015 – 31/04/2015	***Distributed control and computation***	**A. Stephen Morse,** *Yale University, USA*
M18 – GRENOBLE 04/05/2015 – 07/05/2015	***Identification in closed loop operation and controller reduction***	**Ioan D. Landau**, *CNRS GIPSA-LAB, Grenoble, France* **& Alireza Karimi**, *EPFL, Switzerland*
M19 – ISTANBUL 04/05/2015 – 08/05/2015	***Modeling and control of multiphysics systems***	**Arjan van der Schaft**, *University of Groningen* **& Dimitri Jeltsema**, *TU Delft, The Netherlands*
M20 – PARIS-SACLAY 11/05/2015 – 15/05/2015	***Hybrid systems : modeling, stability, robustness, and the math behind it***	**Rafal K. Goebel**, *Loyola Univ. Chicago, IL, USA*
M21 – PARIS-SACLAY 18/05/2015 – 22/05/2015	***Hybrid feedback control systems : analysis and design***	**Ricardo G. Sanfelice**, *Univ. California at Santa Cruz, California, USA*
M22 – PARIS-SACLAY 25/05/2015 – 29/05/2015	***Switched systems and control***	**Daniel M. Liberzon,** *Univ. of Illinois, USA*
M23 – PARIS-SACLAY 01/06/2015 – 05/06/2015	***Predictive and optimization based control for automotive and aerospace applications***	**Ilya Kolmanovsky**, *Univ. of Michigan, USA* **& Stefano Di Cairano,** *Mitsubishi Res. Lab Boston*
M24 – PARIS-SACLAY 08/06/2015 – 12/06/2015	***Networked control with limited data rates***	**Girish Nair**, *Univ. of Melbourne, Australia*

Chair: Francoise Lamnabhi-Lagarrigue <lamnabhi@lss.supelec.fr>

Registration will open on 18/07/2014

European Embedded Control Institute

M9 – BERLIN
23/03/2015 – 27/03/2015

Nonlinear control for physical systems

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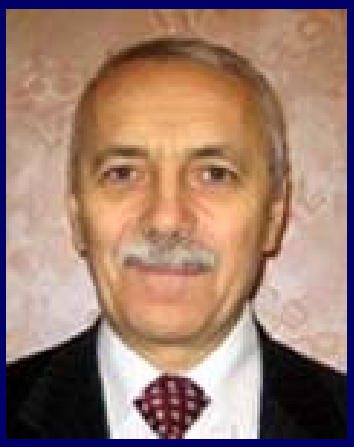

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Abstract of the course

Technological developments have led to a new, exciting and powerful synthesis of physics and control, building on the classical work of notable physicists such as Huygens, Carnot, Szilard, and Kapitza Examples as diverse as managing electric power grids and optimizing inputs for magnet resonance spectroscopy, noise cancellation and vibration technologies are among topics of current interest. Of course, most of these interesting problems fall well outside the usual linear, quadratic, Gaussian framework.

In this course, the unifying principles coming from the consideration of energy, momentum, and reduction principles will be extended to include control terms. Emphasis will be placed on the role of geometrical ideas such as metrics, symplectic structures, Poisson and Lie brackets, etc., when they serve to best explain matters. Examples will be drawn from cyber-physical systems of current interest and the type of control mechanisms that have proven to be effective in this setting.

Topics will include:

Control of conservative systems; Control of dissipative systems; Synchronization and control of chaos; The Lyapunov-Krasovskii functionals and Demidovich condition; Statistical Mechanics and Learning Theory, Quantum control and Quantum information.