

Preliminary Announcement

Summer School on
"Modelling and Control of Complex Physical Systems"
July, 6 - 12, 2003

University of Bologna Residential Centre of Bertinoro, FC, Italy
<http://www.centrocongressibertinoro.it/>

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A fundamental concept in engineering sciences is the notion of an "open system", that is a system having a direct interface with its environment. The concept of an open system is directly linked to the notion of a network, where open systems are coupled to each other through their interfaces. Complementary to the network modelling of complex systems is the design and control of systems with a required functionality by coupling open system components.

Aim of the Summer School is to present methods, techniques and tools for modelling and control of complex physical systems, using an integrated system approach allowing to deal with physical components stemming from different physical domains (electrical, mechanical, thermodynamic, ..), both in the lumped-parameter and in the distributed-parameter case.

In particular, in order to describe and to manipulate these dynamical models in a systematic way it is convenient to use a coordinate-free, geometric framework for their mathematical formulation, especially because of the intrinsic and strong nonlinearities in their system behaviour. The framework of port-Hamiltonian systems, where the physical components are formulated as generalized Hamiltonian systems, coupled to each other through power ports, will be presented in the Summer School by leading researchers. In this context, the resulting complex physical system can be geometrically described as a Hamiltonian system with respect to the geometric object of a Dirac structure.

Special CACSD tools (20-sim) as well as several case studies, taken from different engineering fields (robotics, electric drives, chemical processes, ...) will be presented and discussed.



The Summer School is organized within the activities and the framework of GEOPLEX "Geometric Network Modelling and Control of Complex Physical Systems", an EU research programme, IST-2001-34166, <http://www.geoplex.cc>.