Institute of Advanced Study

University of Bologna

IN COLLABORATION WITH

DIPARTIMENTO DI ELETTRONICA, INFORMATICA E SISTEMISTICA

COLLEGIO SUPERIORE ALMA MATER STUDIORUM DI BOLOGNA

INSTITUTE LECTURE

BERNHARD MASCHKE

Laboratoire d'Automatique et de Génie des Procédés,

Université Claude Bernard, Lyon and ISA Guest

"MODELLING ORIGINS AND PROPERTIES OF INFINITE DIMENSIONAL PORT HAMILTONIAN SYSTEMS"

Thursday, July 22nd 2004, 15.30 a.m.

C.A.S.Y. - Center on Complex Automated Systems "Giuseppe Evangelisti"
Via Pepoli 3/2 - Bologna

ABSTRACT AND BRIEF CURRICULUM VITAE

In this talk, “MODELLING ORIGINS AND PROPERTIES OF INFINITE DIMENSIONAL PORT HAMILTONIAN SYSTEMS”, we shall present in the first part the modelling origins of infinite-dimensional port Hamiltonian systems. We shall show how Stokes-Dirac structure arise naturally from the formulation of distributed parameter systems as systems of conservation laws starting with very classical examples. In the second part we shall define boundary port Hamiltonian systems with respect to Stokes-Dirac structures, illustrate it on some examples and give some extension to irreversible systems on the example of heat conduction. In a third part we shall briefly introduce a generalization of this class of system associated with linear skew-symmetric operators of higher differential degree and relate them to boundary control systems.

B. Maschke was graduated as engineer in telecommunication at the Ecole Nationale Superieure des Telecommunications (Paris, France) in 1984. He received in 1990 his Ph. D. degree and in 1998 the Habilitation to Direct Researches both from the University of Paris-Sud (Orsay, France). From 1990 until 2000 he has been associate professor at the Laboratory of Industrial Automation of the Conservatoire National des Arts et Metiers (Paris, France) and since 2000 he is professor in Automatic Control at the Laboratory of Control and Chemical Engineering of the University Claude Bernard of Lyon (Villeurbanne, France). He has been visiting scientist in 1990 for six months and in 1999-2000 for 18 months at the University of Twente (Enschede, The Netherlands). His current research deals with the network modelling of physico-chemical processes using bond graphs, port-Hamiltonian systems, modelling and control of distributed parameter systems.