Colloquio De Giorgi

24 February
2023
4:00 pm

Aula Dini
Palazzo del Castelletto
via del Castelletto
Pisa

VOLKER MEHRMANN
Technische Universität Berlin

Dirac and Lagrange structures in energy-based mathematical modeling

Abstract: Most real world dynamical systems consist of subsystems from different physical domains, modelled by partial-differential equations, ordinary differential equations, and algebraic equations, combined with input and output connections.
To deal with such complex system, in recent years the class of dissipative port-Hamiltonian (pH) descriptor systems has emerged as a very successful modeling methodology. The main reasons are that the network based interconnection of pH systems is again pH, Galerkin projection in PDE discretization and model reduction preserve the pH structure and the physical properties are encoded in the geometric properties of the flow as well as the algebraic properties of the equations. Furthermore, dissipative pH system form a very robust representation under structured perturbations and directly indicate Lyapunov functions for stability analysis. Using global geometric and algebraic points of view, via Dirac and Lagrange spaces or manifolds, translations between different representations are presented.
Characterizations are also derived when a general differential-algebraic system can be transformed into one of these structured representations. Numerical approaches for computing the structural information and the described transformations are derived and the results are demonstrated with some real world examples.

Web site: *http://www.crm.sns.it/course/6529/*

The event will take place in person. Please note that for organizational purposes, registration is mandatory.

Elaborazione a cura dell'Ufficio Comunicazione – SNS

info
crm@sns.it

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Centro di Ricerca Matematica Ennio De Giorgi