universität wien

Fakultät für Mathematik

Mathematisches Kolloquium

Mittwoch, 22. Juni 2022
Sky Lounge

EINLADUNG

Prof. Dr. Volker Mehrmann
(TU Berlin, European Mathematical Society)

15.00 Uhr: "The European Mathematical Society. Supporting the mathematical community in Europe"

15.45 Uhr: Kaffeejause

16.15 Uhr: "Energy based modeling, simulation and optimization of real world problem. A paradigm change"

"The European Mathematical Society. Supporting the mathematical community in Europe"

Abstract:
The European Mathematical Society (EMS) will be presented and how it supports the mathematical community. This includes the organizational and financial support for scientific events, the lobbying for mathematics in Brussels, the EMS Publishing House and its Subscribe-to-Open strategy, the support for mathematics in developing countries.

"Energy based modeling, simulation and optimization of real world problem. A paradigm change"

Abstract:
Most real world dynamical systems consist of subsystems from different physical domains, modeled by partial differential equations, ordinary differential equations, algebraic equations, combined with input and output connections. To deal with such complex systems, in recent years energy based modeling using the class of dissipative port-Hamiltonian (pH) systems has emerged as a very efficient new 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. We discuss dissipative pH systems and describe, how many classical models can be formulated in this class. We illustrate some of the nice properties, including local canonical forms, the formulation of an associated Dirac structure, and the local invariance under space-time dependent diffeomorphisms. The results are illustrated with some real world examples.

Kleines Buffet im Anschluss

Radu Ioan Bot