7th IFAC Workshop on
Lagrangian and Hamiltonian Methods for Nonlinear Control
October 11-13, 2021, Berlin, Germany

Scope – Advances in technology and the progress in digitalization and automation require to account for diverse nonlinear phenomena in the design of increasingly complex control systems that are connected via digital communication networks and process increasing amounts of acquired data (such as for digital twins or Industry 4.0). Very efficient and robust approaches for modeling, numerical approximation, order reduction, simulation, and control design are based on Lagrangian and Hamiltonian system formulations. For example, the port-Hamiltonian framework has made significant progress in methodology and applications to cope with heterogeneous networks of different types, coupled multi-physical and thermodynamic systems. Such energy-based formulations allow to combine the powerful design methods of passivity-based control with the specific properties of the differential-geometric structures of Lagrangian and Hamiltonian systems. Recent developments have shown the power of the Hamiltonian and Lagrangian framework for distributed parameter systems, in combination with adapted numerical schemes, with many examples in fluid dynamics, acoustics, fluid-structure interaction, quantum mechanics and irreversible thermodynamics. Application areas of Lagrangian and Hamiltonian methods in nonlinear control include, among others, robotics, tele-manipulation, multi-carrier power and transportation systems, chemical engineering, biological processes and smart materials.

Goals – The 7th IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control (LHMNC 2021) at the Technical University of Berlin wants to bring together control experts from different areas to exchange on physical structures as the foundation of versatile design methods, to discuss new approaches for modeling, analysis and control design, and to present state-of-the-art results on applications to complex dynamical engineering systems. With the first paper on port-Hamiltonian systems appeared in 1992, the workshop is also an ideal occasion to celebrate in special sessions the (almost) 30th anniversary of this successful framework.

Sponsored by IFAC TC 2.3 Non-Linear Systems. Co-sponsored by IFAC TCs 2.1 Control Design, 2.6 Distributed Parameter Systems, IEEE CSS TC on DPS, DFG Collaborative Research Center 910, Excellence Center MATH+, GAMM (Int. Ass. of Applied Mathematics and Mechanics).

Important Dates:		IPC Co-Chairs:	Yann Le Gorrec, Besançon (FR)
			Arjan van der Schaft, Groningen (NL)
Submission of invited session			Bernhard Maschke, Lyon (FR)
proposals and draft papers:	April 12, 2021		
		NOC Co-Chairs:	Volker Mehrmann, Berlin (DE)
Author notification:	June 30, 2021		Paul Kotyczka, Munich (DE)
Final papers due:	July 31, 2021	Editor:	Alessandro Macchelli, Bologna (IT)

The organizing committee is closely monitoring the pandemic situation. The workshop may be postponed or the on-site format may be changed into an online or hybrid format. Please check the website for regular updates: https://lhmnc21.org.