IWR Colloquium
Winter Semester 2018 / 2019

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Mathematikon, Conference Room / 5th Floor
Im Neuenheimer Feld 205, 69120 Heidelberg

Speaker:
Dr. Sara Grundel
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Title:
"Simulation and Optimization of Energy Networks"

Abstract:
My recent work centers around the simulation of energy networks. In my talk, I will discuss the mathematical challenges as well as some recent results to efficiently simulate transient gas flow within a realistic gas pipeline transportation network. Mathematical models of such a system start from a set of hyperbolic partial differential equations, combined with ordinary differential equations and algebraic equations. Picking the necessary complexity is the first choice to make and discretization allows for a variety of choices again, whose implications we briefly discuss. Finally we attain a system of ordinary differential or differential-algebraic equations (ODE/DAE) that can be successfully reduced in complexity via classical model order reduction techniques. We discuss and compare some known methods for different pipeline networks. Furthermore we introduce an automatic clustering algorithm based on model order reduction principles and its application in power grids as well as water distribution networks.

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