JOHANNES KEPLER UNIVERSITY LINZ

Johannes Kepler Universität Linz
Institut für Numerische Mathematik

Univ.-Prof. Dr. Herbert Egger

Talk announcement (ZOOM)

Nora Philippi
(TU Darmstadt)

Tuesday, Jan 25, 2022
15:30, via Zoom

Relative energy estimates, asymptotic stability and structure preserving discretization for isentropic flow in gas networks

Gas transport in one-dimensional pipe networks can be described as an abstract dissipative Hamiltonian system, for which quantitative stability bounds can be derived by means of relative energy estimates for subsonic flow. We can prove convergence to the parabolic limit problem in the practically relevant highfriction regime. Furthermore, the stability estimates are inherited almost verbatim by variational discretization schemes.We propose a mixed finite element method with an implicit Eulertime discretization, leading to order optimal convergence rates which are uniform in the scaling to the high friction limit. Allresults will be explained in detail for the flow on a single pipe, but in the spirit of the port-Hamiltonian formalism, they naturally extend to pipe networks.