Abstract:
One research objective in the Priority Program 1897 "Calm, Smooth and Smart" of the German Research Foundation (DFG - SPP 1897) is the development of model order reduction techniques for parametric non-linear mechanical systems to enable efficient design, simulation, analysis, optimization and control of those. As a starting point for our research, this contribution provides an overview of the main challenges and well-established reduction techniques in this research area, at that stage, neglecting parameter dependencies. This includes simulation-based as well as simulation-free reduction bases generation and hyperreduction of the non-linear force terms. An extension of the Krylov directions in moment matching based on the concept of modal derivatives is also sketched.

Stichworte:
Geometric non-linearity; Projective model order reduction; Modal truncation; Modal derivatives; Moment matching; Krylov-derivatives; Hyperreduction; DEIM; ECSW