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Autor(en) des Beitrags: Lerch, C.; Meyer, C.H.
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Abstract: Finite element analyses of advanced mechanical structures that undergo large deformations usually lead to high-dimensional systems of nonlinear equations. For applications such as parameter studies and optimization, where the equations of motion have to be solved several times, it is highly demanded to reduce the computation time for solving the equations. Model order reduction can satisfy this demand by projecting the equation of motion onto a subspace and approximating the nonlinear term by using Hyperreduction techniques. However, the best subspace for projection as well as the hyperreduction strongly depend on the system properties which is a main issue for applications like parameter studies, optimization and control, where the system properties, such as shape, material, and boundary conditions, are parametric. This contribution gives an overview over the reduction process for parametric structures with large deflections that are simulated with the finite element method. It also shows the main features and modular structure of the open source research code "AMfe", which is used by the authors to develop new reduction techniques.