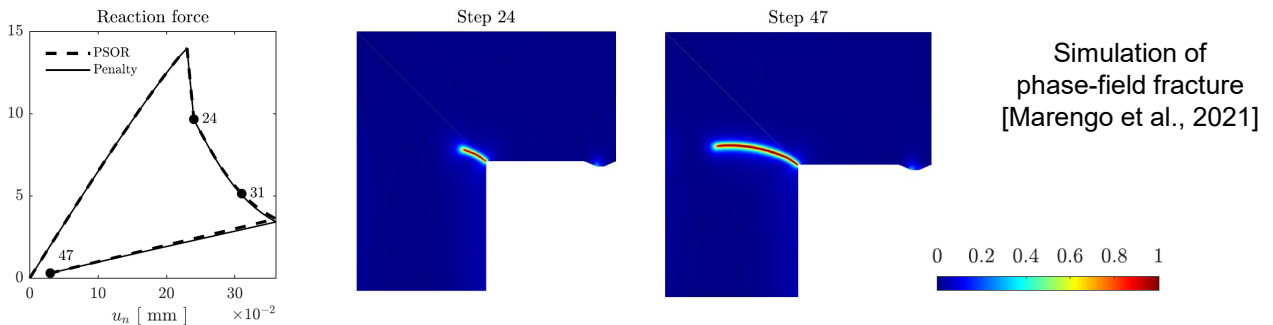


Masterarbeit

Phase-field modeling of fracture

The prevention of fracture-induced failure is a major constraint in engineering designs. Therefore, numerical simulation of fracture offers a decision-making aid tool within the engineering design process, ultimately reducing the necessity of expensive and time-consuming experimental tests. As a consequence, a wide variety of fracture numerical models have been proposed, among which the phase-field method has gained a lot of popularity as it can elegantly simulate complicated fracture processes, including crack initiation, propagation, merging, and branching.



In this thesis, we focus on the phase-field modeling for Kirchhoff-Love shells in a dynamic brittle fracture framework, investigating the role of time integration schemes (e.g., Newmark, 1959). Numerical simulations will be carried out using an in-house MATLAB-based analysis code.

Tasks:

- Phase-field literature review
- Getting acquainted with the provided in-house MATLAB-based code
- Supervised code extension to dynamics (i.e., combining the available Kirchhoff-Love shell quasi-static phase-field formulation with the time integration scheme already present in the in-house MATLAB-based code)
- Numerical simulations and analysis of the results

Background knowledge:

- Basics of Kirchhoff-Love shells, dynamics
- Knowledge of MATLAB