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Bachelorarbeit

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.

A finite element simulation of phase-field fracture [Marengo et al., 2021]
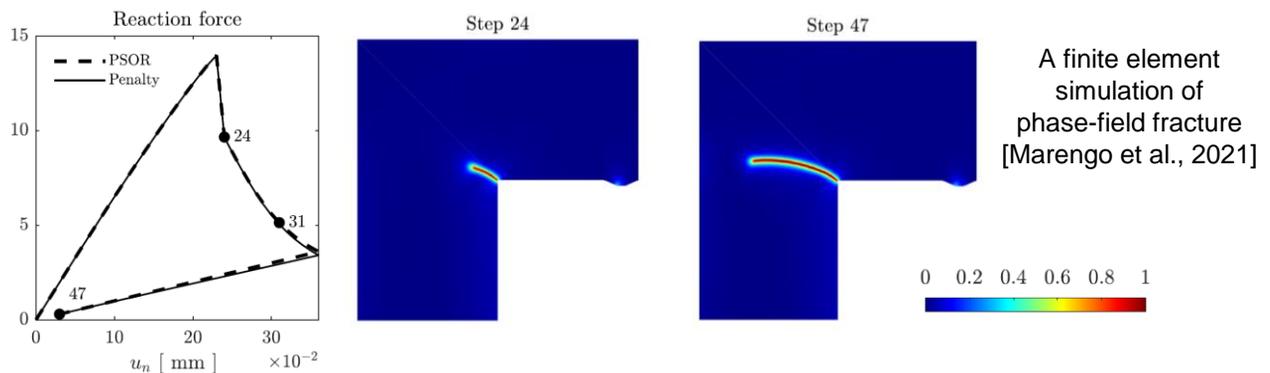
In this thesis, we focus on the phase-field model for brittle fracture in a dynamic framework investigating the role of time integration schemes. Numerical simulations will be carried out using an in-house finite element code.

Tasks:

- Phase-field literature review

- Getting acquainted with the provided finite element code

- Supervised code extension (mass matrix, time integration scheme) to dynamics

- Numerical simulations and analysis of the results

Background knowledge:

- Basics of the Finite element method

- Knowledge of MATLAB

Starttermin: flexible

Stand: 15.06.2023

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