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A PHASE-FIELD FRAMEWORK FOR COHESIVE FRACTURE

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Cohesive fracture models can be characterized by the assumption of a fracture energy depending on the crack opening width, resulting in cohesive stresses over the crack surfaces (traction-separation law). These cohesive zone models can be described in a finite element approximation by means of either sharp interfaces or by means of so-called diffusive interfaces. For the latter one, the phase-field approach is a common choice. Here, tracking of the evolving interfaces is automatically included in the model.

A promising variational phase-field approach of cohesive fracture was introduced by Conti et al. (2015) [1] and numerically investigated by Freddi and Iurlano (2017) [2]. In this talk, the model shall be extended to a geometrically exact three-dimensional setting including suppressed crack propagation under compressive states (microcrack-closure-reopening effect (MCR)). The extended model then captures

- microcracking induced softening,
- the microcrack-closure-reopening effect (MCR),
- the use of arbitrary hyperelastic finite strain material models and
- the tensile strength and the fracture energy can be prescribed independently.

Numerical experiments will show the predictive capabilities of the resulting model.

REFERENCES

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