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ATTEMPTS TO VALIDATE PHASE-FIELD FRACTURE FOR NEARLY INCOMPRESSIBLE SOLIDS WITH EXPERIMENTAL DATA

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ABSTRACT

In this presentation, we propose the first steps of validating a phase-field model for nearly incompressible solids. To avoid locking effects therein, we propose a mixed form for the solid displacement equation as formulated in [1]. For the numerical solution, we adopt a fully-coupled approach, which is implemented in DOpElib [2] and currently extended with adaptive mesh refinement and parallelization using the deal.II-github-phase-field framework [3]. To validate this new phase-field model for rubber-like materials, we compare - in collaboration with the Deutsches Institut für Kautschuktechnologie e. V., Hannover, Germany, - experimental data of crack propagation in Carbon Black filled EPDM rubber against our numerical simulations and figure out differences, difficulties and challenges.

REFERENCES

[1] K. Mang, T. Wick, W. Wollner, A phase-field model for fractures in nearly incompressible solids, *Computational Mechanics*, published online, 2019.

[2] DOpElib: The Differential Equation and Optimization Environment, www.dopelib.net

[3] T. Heister and T. Wick, Parallel solution, adaptivity, computational convergence, and open-source code of 2D and 3D pressurized phase-field fracture problems, PAMM, Vol. 18(1), 2018, doi: 10.1002/pamm.201800353