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IDENTIFYING PROCESSES GOVERNING DAMAGE EVOLUTION IN QUASI-STATIC ELASTICITY PART 2 - NUMERICAL SIMULATIONS

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Abstract. We investigate numerically a quasi-static elasticity system of Kachanov-type. To do so we propose an Euler time discretization combined with a suitable finite elements scheme (FEM) to handle the discretization is space. We use ODE-type arguments to prove the consistency of the scheme as well as its convergence rate. We rely on the computational platform FEniCS© to perform the FEM discretizations in space needed to compute the model output. The simulation results show a good agreement with both the physics of the problem and with our previous qualitative mathematical analysis results obtained for precisely the same problem setting. Furthermore, our implementation recovers nicely the theoretically expected convergence rate. This is a preliminary study preparing the framework for the rigorous numerical identification of the damage process in Kachanov-type models.

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