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Isogeometric space-time adaptivity for phase field-based fracture of shells

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Phase field methods for the prediction of fracture gained popularity due to their flexibility and simple implementation. This work investigates dynamic brittle fracture of shell structures within a curvilinear coordinate system. The kinematics follow from Kirchhoff-Love theory [2]. An isogeometric discretization is used to obtain the required higher continuity. This framework is extended to the modeling of multi-patch shell structures by enforcing appropriate continuity constraints [4]. The phase field framework is formulated in the convective coordinate system and a higher order phase field model is employed [1]. Locally Refinable (LR) splines are used for the adaptive local refinement of the finite element mesh, and a coarsening approach is employed to coarsen the mesh in the wake of the crack tip. Further notes on mesh dependency issues for high loading rates are made.

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