

Phase field fracture model for viscoplastic material in large deformations- CFRAC 2019

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ABSTRACT

Phase-field modeling approach to material fracture and damage has received growing interest among researchers. It has proven to be an effective way to address crack related discontinuities in continuum mechanics. Also, it solves the problem related to tracking the fracture surface by simply representing the fracture phase with a continuous field variable. Recently, phase-field fracture models have been extended to finite deformations, crack nucleation and applied to complex material behaviors such as plasticity and viscoplasticity. In this contribution we describe a viscoplastic model coupled with a phase field dynamic fracture model in a large strain formulation. The model include damage, history, rate and temperature dependant behavior. A finite element implementation is presented in a staggered time integration. Moreover, we address the crack closure and crack surfaces interpenetration taking into account tension-compression strength asymmetry. Performance of the model on dynamic crack propagation are presented.

REFERENCES

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