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Computational Methods for Dynamic Crack Propagation

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ABSTRACT

Several methods for dynamic computational fracture mechanics are reviewed, and their performance in some benchmark problems is reviewed. The methods considered include element deletion, inter-element unzipping models and the extended finite element method. Element deletion consists of simply deleting the element when a material criterion is met. The inter-element crack models are of the type proposed by Xu and Needleman, and by Ortiz and Pandolfi. The extended finite element method permits arbitrary crack propagation within the mesh. Advancement of the crack by several criteria is studied. Among the results that are compared are the crack paths, the speed of the crack and the energy dissipated by the fracture process.