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**Performance of time-stepping schemes for discrete models in fracture dynamic analysis.**

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Summary: We present a critical evaluation of different time integration schemes within the setting of nonlinear dynamic analysis of brittle fracture problem represented by a discrete model. The discrete model of this kind consists of Voronoi cells representing the grains of a heterogeneous structure, which are interconnected by cohesive forces modelled by beam-like links capable of taking properly into account both brittle dynamic fracture and large displacement of a still connected pack of grains that might split from the structure. The brittle behaviour of cohesive links requires that the dynamic analysis of such a model must be performed with care, and the best possible integration scheme must be selected. Four different schemes are explored and compared in application to a dynamic traction test, including Newmark explicit and implicit schemes, HHT- $\alpha$  scheme and energy-decaying scheme.

**MSC:**

**74S20** Finite difference methods applied to problems in solid mechanics

**74R10** Brittle fracture

Cited in **5** Documents

**Keywords:**

Voronoi cells; Newmark schemes; energy-decaying scheme

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