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Assumed strain stabilization of the 4-node quadrilateral with 1-point quadrature for non-linear problems. (English) [Zbl 0742.73019](#)

Comput. Methods Appl. Mech. Eng. 88, No. 3, 311-340 (1991).

Summary: Stabilization methods which are based on material and geometric parameters are developed via the Simo-Hughes assumed strain method. The assumed strain fields are constructed so that those portions of the fields which lead to volumetric and shear locking are eliminated by projection. The stabilization forces are then independent of the bulk modulus making them ideal for nonlinear incompressible problems such as plasticity in metals. Convergence studies are made for several test problems.

MSC:

[74S05](#) Finite element methods applied to problems in solid mechanics

[74C15](#) Large-strain, rate-independent theories of plasticity (including nonlinear plasticity)

[74C20](#) Large-strain, rate-dependent theories of plasticity

[74S30](#) Other numerical methods in solid mechanics (MSC2010)

[74P10](#) Optimization of other properties in solid mechanics

[74M05](#) Control, switches and devices ("smart materials") in solid mechanics

Cited in **63** Documents

Keywords:

Hu-Washizu variational principle; rate of convergence; Simo-Hughes strain method; volumetric; shear locking; eliminated by projection; stabilization forces; independent of the bulk modulus; nonlinear incompressible problems; plasticity in metals

Software:

DYNA3D

Full Text: [DOI](#)

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