Wu, C. T.; **Koishi, M.**; **Hu, W.**

A displacement smoothing induced strain gradient stabilization for the meshfree Galerkin nodal integration method. (English) Zbl 1329.74292

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Summary: In this paper, we present a gradient-type stabilization formulation for the meshfree Galerkin nodal integration method in liner elastic analysis. The stabilization is introduced to the standard variational formulation through an enhanced strain induced by a decomposed smoothed displacement field using the first-order meshfree convex approximations. It leads to a penalization formulation containing a symmetric strain gradient stabilization term for the enhancement of coercivity in the direct nodal integration method. As a result, the stabilization parameter comes naturally from the enhanced strain field and provides the simplest means for effecting stabilization. This strain gradient stabilization formulation is also shown to pass the constant stress patch test if the SCNI scheme is applied to the non-stabilized terms. Several numerical benchmarks are examined to demonstrate the effectiveness and accuracy of the proposed stabilization method in linear elastic analysis.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
65N30 Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs

Cited in **7** Documents

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