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Element-free Galerkin methods. (English) Zbl 0796.73077
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An element-free Galerkin method which is applicable to arbitrary shapes but requires only nodal data is applied to elasticity and heat conduction problems. In this method, moving least-squares interpolants are used to construct the trial and test functions for the variational principle (weak form); the dependent variable and its gradient are continuous in the entire domain. The numerical examples show that with these modifications, the method does not exhibit any volumetric locking, the rate of convergence can exceed that of finite elements significantly and a high resolution of localized steep gradients can be achieved. The moving least-squares interpolants and the choices of the weight function are also discussed.

MSC:

- 74S30 Other numerical methods in solid mechanics (MSC2010)
- 74P10 Optimization of other properties in solid mechanics
- 74S05 Finite element methods applied to problems in solid mechanics
- 74B99 Elastic materials
- 80A20 Heat and mass transfer, heat flow (MSC2010)

Cited in **2** Reviews
Cited in **1399** Documents

Keywords:

moving least-squares interpolants; variational principle; convergence; resolution of localized steep gradients; weight function

Full Text: [DOI](#)

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