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Efficient calculation of internal results in 2D elasticity BEM. (English) Zbl 1182.74214
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Summary: The solution of boundary integral equations in their discretized form requires an accurate treatment of regular as well as singular integrals. The regular integrals are usually solved numerically using Gauss quadrature. Since these integrations make up the major part of the numerical work the choice of the appropriate Gauss order is essential to an accurate and efficient boundary element analysis. Thus, a considerable number of publications is dealing with the subject of choosing a Gauss order suitable to gain efficiency without losing accuracy. The guidelines determining the choice of the appropriate Gauss order is usually called an integration criterion. This paper presents a study on this topic with emphasis on the accuracy of internal results in 2D elasticity. First the necessity for a new integration criterion is shown. Then a new criterion is derived. This new criterion and various existing criteria from the literature are applied to a standard benchmark problem. The superior performance of the novel criterion is demonstrated.

MSC:

74S15 Boundary element methods applied to problems in solid mechanics
74B05 Classical linear elasticity

Cited in **9** Documents

Keywords:

boundary element method; error bound estimate; adaptive integration scheme; numerical integration

Software:

BEMECH

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