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**On a regularized method of fundamental solutions coupled with the numerical Green's function procedure to solve embedded crack problems.** (English) [Zbl 1351.74089](#)

Eng. Anal. Bound. Elem. 37, No. 1, 1-7 (2013).

Summary: The method of fundamental solutions (MFS) is applied to solve linear elastic fracture mechanics (LEFM) problems. The approximate solution is obtained by means of a linear combination of fundamental solutions containing the same crack geometry as the actual problem. In this way, the fundamental solution is the very same one applied in the numerical Green's function (NGF) BEM approach, in which the singular behavior of embedded crack problems is incorporated. Due to severe ill-conditioning present in the MFS matrices generated with the numerical Green's function, a regularization procedure (Tikhonov's) was needed to improve accuracy, stabilization of the solution and to reduce sensibility with respect to source point locations. As a result, accurate stress intensity factors can be obtained by a superposition of the generalized fundamental crack openings. This mesh-free technique presents good results when compared with the boundary element method and estimated solutions for the stress intensity factor calculations.

**MSC:**

[74S10](#) Finite volume methods applied to problems in solid mechanics

[74R10](#) Brittle fracture

[74G10](#) Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.) of equilibrium problems in solid mechanics

Cited in 4 Documents

**Keywords:**

MFS; Green's function; Tikhonov; BEM; crack

**Full Text:** [DOI](#)