Journal of Applied Mechanics

J. Appl. Mech. / Volume 68 / Issue 4 / TECHNICAL PAPERS

Dynamic Crack Analysis Under Coupled Thermoelastic Assumption

J. Appl. Mech. -- July 2001 -- Volume 68, Issue 4, 584 (5 pages)
doi:10.1115/1.1364490

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A boundary element method using Laplace transform in time domain is developed for the analysis of fracture mechanic under coupled thermoelastic assumption. The transient coupled thermoelastic field is solved without need for domain discretization. The singular behavior of the temperature and displacement fields in the vicinity of the crack tip is modeled by quarter-point elements. Thermal dynamic stress intensity factors for mode I are evaluated from computed nodal values, using the well-known displacement and traction formulas. The accuracy of the method is investigated through

comparison of the results with the available data in literature. The conditions where the inertia term plays an important role is discussed and variations of the dynamic stress intensity factor is investigated.

History: Received Oct. 7, 1999; revised Sept. 19, 2000
doi: http://dx.doi.org/10.1115/1.1364490

KEYWORDS and PACS

Keywords

thermoelasticity, thermal shock, fracture stresses, crack-edge stress field analysi transforms

PACS

- 46.50.+a
  Continuum mechanics of solids mechanics, fatigue and cracks
- 46.25.Hf
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- YEAR: 2001

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