

**Chen, W. H.; Chen, T. C.**

**An efficient dual boundary element technique for a two-dimensional fracture problem with multiple cracks.** (English) [Zbl 0870.73076](#)

*Int. J. Numer. Methods Eng.* 38, No. 10, 1739-1756 (1995).

The paper presents a boundary element formulation for two-dimensional fracture mechanics problems based on the already established mixed (or dual according to some authors) formulations. The technique adopts the hypersingular (or traction) integral equation over one side of the crack surface and selects the crack opening displacements (relative displacements) for interpolation. Alternative means of computing the finite part integrals are discussed, and examples of multicrack (up to four cracks) problems are also presented to illustrate the accuracy of the procedure.

Reviewer: [J.C.F.Telles \(Rio de Janeiro\)](#)

**MSC:**

[74S15](#) Boundary element methods applied to problems in solid mechanics

[74R99](#) Fracture and damage

Cited in **17** Documents

**Keywords:**

hypersingular integral equation; crack opening displacements

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

**References:**

- [1] Blandford, *Int. j. numer, methods eng.* 17 pp 387– (1981)
- [2] Portela, *Int. j. numer. methods eng.* 33 pp 1269– (1992)
- [3] Portela, *Int. J. Fract.* 55 pp 17– (1992)
- [4] Mi, *Eng. Anal. Boundary Elements* 10 pp 161– (1992)
- [5] Rajiyah, *Eng. Fract. Mech.* 32 pp 911– (1989)
- [6] Chen, *Comput. Struct.* 50 pp 401– (1994)
- [7] Weaver, *Int. J. Solids Struct.* 13 pp 321– (1977)
- [8] Takakuda, *Bull. JSME* 28 pp 217– (1985) · [doi:10.1299/jsme1958.28.217](#)
- [9] Takakuda, *Bull. JSME* 28 pp 225– (1985) · [doi:10.1299/jsme1958.28.225](#)
- [10] Polch, *Comput. Mech.* 2 pp 253– (1987)
- [11] Gray, *Int. j. numer. methods eng.* 29 pp 1135– (1990)
- [12] Ang, *Int. J. Fract.* 31 pp 259– (1986)
- [13] and , 'Traction BIE formulations and applications to non-planar and multiple cracks', in , and (eds.), *Fracture Mechanics: Twenty-Second Symposium, Vol II*, ASTM STP 1131, American Society for Testing and Materials, Philadelphia 1992, pp. 314-332. · [doi:10.1520/STP23712S](#)
- [14] Chien, *Comput. Mech.* 8 pp 57– (1991)
- [15] Liu, *Eng. Anal. Boundary Elements* 8 pp 301– (1991)
- [16] Liu, *Comput. Methods Appl. Mech. Eng.* 96 pp 271– (1992)
- [17] Krishnasamy, *J. Appl. Mech. ASME* 57 pp 404– (1990)
- [18] Cruse, *Comput. Mech.* 11 pp 1– (1993)
- [19] *Boundary Element Analysis in Computational Fracture Mechanics*, Kluwer Academic Publishers, Dordrecht, 1988. · [Zbl 0648.73039](#) · [doi:10.1007/978-94-009-1385-1](#)
- [20] *Elementary Engineering Fracture Mechanics*, Martinus Nijhoff, Boston, 1986. · [doi:10.1007/978-94-009-4333-9](#)
- [21] Chen, *Comput. Struct.* 6 pp 1451– (1989)
- [22] *Handbook of Stress Intensity Factors*, Lehigh University, Bethlehem, Pennsylvania, 1973.
- [23] Chen, *Archive Appl. Mech.* 62 pp 147– (1992)
- [24] Chen, *Eng. Fract. Mech.* 34 pp 921– (1989)

- [25] Liu, Eng. Fract. Mech. 42 pp 273– (1992)
- [26] and , Boundary Element Technique, Springer, New York, 1984.
- [27] and , Boundary Element: An Introductory Course, McGraw-Hill, New York, 1989
- [28] and , The Stress Analysis of Cracks Handbook, Del Research Corporation, St. Louis, MO, 1985.

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.