

Computation of energy release rates for a nearly circular crack.

ABSTRACT

This paper deals with a nearly circular crack, in the plane elasticity. The problem of finding the resulting shear stress can be formulated as a hypersingular integral equation over a considered domain, and it is then transformed into a similar equation over a circular region, D , using conformal mapping. Appropriate collocation points are chosen on the region D to reduce the hypersingular integral equation into a system of linear equations with $(2N+1)(N+1)$ unknown coefficients, which will later be used in the determination of energy release rate. Numerical results for energy release rate are compared with the existing asymptotic solution and are displayed graphically.

Keyword: Nearly circular crack; Plane elasticity; Shear stress; Hypersingular integral equation; Conformal mapping; Energy release rate.