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ANTIPLANE SHEAR MODE STRESS INTENSITY FACTOR FOR A SLIGHTLY PERTURBED CIRCULAR CRACK SUBJECT TO SHEAR LOAD

(Faktor Keamatan Regangan bagi Mod Ricih Anti-Satah untuk Retakan Bulat Sedikit Terusik Tertakluk kepada Beban Ricih)

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ABSTRACT

This paper deals with a slightly perturbed circular crack, Ω in the three dimensional plane. The problem of finding the resulting shear forces can be formulated as a hypersingular integral equation over a considered domain. Conformal mapping is used to transform the integral equation into a similar equation over a circular region, *D*. By making a suitable representation of hypersingular integral equation, the problem is reduced to solve a system of linear equations. The system is solved numerically for the unknown coefficients, which will later be used in determining the antiplane shear mode stress intensity factor. Comparison of the numerical solutions with the existing asymptotic solutions show a good agreement.

Keywords: hypersingular integral equation; conformal mapping; stress intensity factor

ABSTRAK

Dalam makalah ini dibincangkan retakan bulat sedikit terusik, Ω, dalam satah tiga dimensi. Masalah mencari tegasan ricih boleh diformulasikan sebagai persamaan kamiran hipersingular ke atas domain yang dipertimbangkan. Pemetaan menyebentuk dijanakan untuk mentransformasikan persamaan kamiran kepada suatu persamaan yang serupa ke atas kawasan bulat, *D*. Dengan membuat perwakilan persamaan kamiran hipersingular yang sesuai, masalah tersebut diturunkan kepada menyelesaikan sistem persamaan linear. Sistem ini diselesaikan secara berangka untuk menentukan pekali anu yang akan digunakan untuk menentukan faktor keamatan regangan bagi mod ricih anti-satah. Perbandingan keputusan berangka dengan penyelesaian asimptot yang sedia ada menunjukkan kesamaan.

Kata kunci: persamaan kamiran hipersingular; pemetaan menyebentuk; faktor keamatan regangan

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