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STRESS INTENSITY FACTOR FOR A CURVILINEAR EDGE CRACK IN BONDED PLANES SUBJECTED TO TEAR STRESS

(*Faktor Keamatan Regangan untuk Retak Pinggir Lengkung dalam Satah Bercantum di Bawah Regangan Koyakan*)

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ABSTRACT

The singular integral equation (SIE) for a curvilinear edge crack that emerges at the interface of bonded planes under tear stress is formulated by making use of the modified complex potential (MCP) and the continuity conditions of displacement and traction. In the formulation of SIE, the unknown is the dislocation distribution function, while traction serves as the right-hand term. The obtained SIE is solved numerically by a semi-open quadrature rule. Numerical results are presented graphically to demonstrate the behaviour of dimensionless stress intensity factors (SIFs) for Modes I and II with different edge crack configurations and elastic constant ratios.

Keywords: edge crack; singular integral equation; bonded planes; modified complex potentials; stress intensity factor

ABSTRAK

Persamaan kamiran singular (PKS) untuk retak pinggir lengkung yang muncul pada permukaan antara dua satah yang bercantum di bawah regangan koyakan dirumuskan dengan menggunakan keupayaan kompleks terubahsuai (KKT) dan syarat kesinambungan sesaran serta daya tarikan. Dalam perumusan PKS, fungsi taburan sesaran yang tidak diketahui digunakan, manakala daya tarikan berfungsi sebagai terma di sebelah kanan. PKS yang diperoleh diselesaikan secara berangka menggunakan kaedah kuadratur separa terbuka. Keputusan berangka dibentangkan secara grafik untuk menunjukkan tingkah laku faktor keamatan regangan (FKR) tidak berdimensi bagi Mod I dan II dengan konfigurasi retak pinggir dan nisbah pemalar keanjalan yang berbeza.

Kata kunci: retak pinggir; persamaan kamiran singular; satah bercantum; keupayaan kompleks terubahsuai; faktor keamatan regangan

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