Hypersingular integral equation for triple inclined cracks problems in half plane elasticity

ABSTRACT

Hypersingular integral equation associated with the modified complex potential is formulated to solve the three inclined cracks problems in an elastic half-plane with free traction boundary condition. The modified complex potential possesses two parts; the principal and the complementary parts. The principal part is derived from the original complex potential of the crack problem in an infinite plate. The complementary part eliminates the traction along boundary of half-plane caused by the principal part. The crack opening displacements (COD) is the unknown function and the traction is the right hand terms. The appropriate quadrature formula is adapted to solve the integral equation numerically and the stress intensity factor (SIF)is computed. The behaviour of SIF at crack tips is analysed. Numerical examples show that the SIF increases as the angle of inclined cracks and the distance of cracks from the boundary of half-plane increase. Our results are agreeable with the previous works.