Stress intensity factor for multiple cracks in half plane elasticity

ABSTRACT

The multiple cracks problem in an elastic half-plane is formulated into singular integral equation using the modified complex potential with free traction boundary condition. A system of singular integral equations is obtained with the distribution dislocation function as unknown, and the traction applied on the crack faces as the right hand terms. With the help of the curved length coordinate method and Gauss quadrature rule, the resulting system is solved numerically. The stress intensity factor (SIF) can be obtained from the unknown coefficients. Numerical examples exhibit that our results are in good agreement with the previous works, and it is found that the SIF increase as the cracks approaches the boundary of half plane.

Keyword: Cracks; Stress intensity factor; Half-plane; Elasticity