Stress intensity factor for multiple inclined or curved cracks problem in circular positions in plane elasticity

ABSTRACT

The problems of multiple inclined or curved cracks in circular positions is treated by using the hypersingular integral equation method. The cracks center are placed at the edge of a virtual circle with radius R. The first crack is fixed on the x-axis while the second crack is located on the boundary of a circle with the varying angle, θ. A system of hypersingular integral equations is formulated and solved numerically for the stress intensity factor (SIF). Numerical examples demonstrate the effect of interaction between two cracks in circular positions are given. It is found that, the severity at the second crack tips are significant when the ratio length of the second to the first crack is small and it is placed at a small angle of θ.

Keyword: Stress intensity factor; Multiple inclined or curved cracks; Circular position; Hypersingular integral equation