

Stress intensity factors for a crack in bonded dissimilar materials subjected to various stresses

ABSTRACT

The modified complex variable function method with the continuity conditions of the resultant force and displacement function are used to formulate the hypersingular integral equations (HSIE) for an inclined crack and a circular arc crack lies in the upper part of bonded dissimilar materials subjected to various remote stresses. The curve length coordinate method and appropriate quadrature formulas are used to solve numerically the unknown crack opening displacement (COD) function and the traction along the crack as the right hand term of HSIE. The obtained COD is then used to compute the stress intensity factors (SIF), which control the stability behavior of bodies or materials containing cracks or flaws. Numerical results showed the behavior of the nondimensional SIF at the crack tips. It is observed that the nondimensional SIF at the crack tips depend on the various remote stresses, the elastic constants ratio, the crack geometries and the distance between the crack and the boundary.

Keyword: Stress intensity factor; Bonded dissimilar materials; Complex variable function; Hypersingular integral equation