

Stress intensity factor for a thermally insulated crack in bonded dissimilar materials.

ABSTRACT

The modified complex variable function method with the continuity conditions of the resultant force, displacement and heat conduction functions are used to formulate the hypersingular integral equation (HSIE) for a thermally insulated circular arc crack or a thermally insulated inclined crack in the upper part of bonded dissimilar materials subjected to remote stress. The HSIE is solved numerically for the unknown crack opening displacement function and the known traction along the crack as the right hand term using the appropriate quadrature formulas. Numerical results showed the behavior of the nondimensional stress intensity factor (SIF) at all crack tips. The nondimensional SIF depends on the crack geometries, the distance between crack and the boundary, the elastic constants ratio, the heat conductivity ratio and the thermal expansion coefficients ratio.

Keyword: Intensity factor; Thermally insulated crack; Bonded dissimilar materials; Modified complex variable; Hypersingular integral equation.