Computation of stress intensity factor for multiple cracks using singular finite element

Abstract

The simplification of two dimensional approaches in singular finite elements has promoted the method to be used in the formulation of stress intensity factor (SIF) of multiple cracks in finite body. The effect of shielding and amplification are considered in defining the SIF. As been observed, the current available analytical approximations are more restricted to several assumptions. The more accurate and less restricted method has motivated this study. This paper presents the investigation of singular finite elements applied in two dimensional finite element models subjected to different crack-width ratio and cracks interval ratio. The newly finite element formulations are resulted with good agreement with theoretical statement compared to analytical solution. The weak points of presented analytical solution are discussed regards to the influence of crack width ratio and cracks interval ratio.