

In this work, a hybridization technique is proposed. It consists of using two weight functions to model elliptical cracks for computation of the stress intensity factor 'SIF' in mode I. The idea of hybridization consists of dividing the ellipse into two zones, then to use each weight function in the area where it is more efficient. The proportion between the two zones is determined by optimization of the ellipse axis ratio. A computer code is developed for the computation of SIF. The treatment of the numerical procedures including singularities are presented in detail. The approach is tested on several applications (elliptical crack in infinite body, semi-elliptical cracks in thin and thick cylinders), to demonstrate its accuracy by minimization of the error of SIF and its correlation with respect to other researchers