

A hybrid weight function method (HWFM), improving the calculation of the stress intensity factor (SIF) in mode I, has recently been proposed and validated in the static case [B.K. Hachi, S. Rechak, M. Haboussi, M. Taghite, Modélisation des fissures elliptiques internes par hybridation de fonctions de poids, C. R. Mécanique 334 (2006) 83–90]. In the present Note, the hybridization approach is presented for the fatigue crack growth prediction of embedded elliptical crack in infinite bodies. Hence, Paris's law of crack propagation is incorporated into the developed hybridization-based computer code, along with two degrees of freedom technique for managing the crack evolution and the cracked structure fatigue life. Simulations of the evolution of elliptical cracks (in infinite bodies) of different configurations (ellipse axes ratio, maximum crack advance) corresponding to fatigue and brittle fracture have been conducted. Comparisons with other numerical methods such as the classical weight function method (WFM) or the extended finite element methods (X-FEM) show the pertinence of the HWFM in the treatment of an aspect of fatigue cracking problems