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Obtain the Stress Intensity Factor (SIF) in a Medium Containing a Penny-Shaped Crack by the Ritz Method

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Abstract : In the crack growth analysis, the Stress Intensity Factor (SIF) is a fundamental prerequisite. In the present study, the mode I stress intensity factor (SIF) of three-dimensional penny-Shaped crack is obtained in an isotropic elastic cylindrical medium with arbitrary dimensions under arbitrary loading at the top of the cylinder, by the semi-analytical method based on the Rayleigh-Ritz method. This method that is based on minimizing the potential energy amount of the whole of the system, gives a very close results to the previous studies. Defining the displacements (elastic fields) by hypothetical functions in a defined coordinate system is the base of this research. So for creating the singularity conditions at the tip of the crack the appropriate terms should be found.

Keywords : penny-shaped crack, stress intensity factor, fracture mechanics, Ritz method
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