

General analytical solution for stress intensity factor of a hypocycloid hole with many cusps in an infinite plate.

ABSTRACT

In this article, the problem for the determination of the displacement functions and the stress intensity factors (SIFs) around a boundary of a hypocycloid hole with cusps in an infinite elastic plate subject to normal and shear stresses are presented. A hole with cusps (hypocycloid) is mapped onto a unit circle and the modified complex potential is used for solving the relevant boundary value problems. An analytical solution for the SIF of a hypocycloid hole is obtained. For a special case, our results agree with others.

Keyword: Hypocycloid hole; Stress intensity factor; Conformal mapping; Modified complex potential; Deformation.