عنوان مقاله:

Analytical Stress Solutions of an Orthotropic Sector Weakened by Multiple Defects by Dislocation Approach

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خلاصه مقاله:

In this article, the anti-plane deformation of an orthotropic sector with multiple defects is studied analytically. The solution of a Volterra-type screw dislocation problem in a sector is first obtained by means of a finite Fourier cosine transform. The closed form solution is then derived for displacement and stress fields over the sector domain. Next, the distributed dislocation method is employed to obtain integral equations of the sector with cracks and cavities under anti-plane traction. These equations are of Cauchy singular kind, which are solved numerically by generalizing a numerical method available in the literature by means of expanding the continuous integrands of integral equations with different weight functions in terms of Chebyshoff and Jacobi polynomials. A set of examples are presented to demonstrate the applicability of the proposed solution procedure. The geometric and force singularities of stress fields in the sector are also studied and compared to the earlier reports in the literature.

کلمات کلیدی:

Anti-plane, Sector, Orthotropic, Stress intensity factor, Hoop stress

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