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Stress analysis in an isotropic hyperbolic rotating disk fitted with rigid shaft. (English)
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Summary: The purpose of this paper is to present study of stresses distribution and displacement in an isotropic hyperbolic rotating disk fitted with rigid shaft and having variable density parameter by using transition theory. It has been seen that the convergent disk made of rubber material requires a higher angular speed at the inner surface as compared to aluminum alloy material on the initial yielding stage, but for the fully plastic stage divergent disk requires higher angular speed at the inner surface as compared to a uniform/convergent disk. With the introduction of density parameter, the values of angular speed increase in the inner surface the initial/fully plastic stage. The convergent disk made of rubber material requires maximum radial stress at the inner surface as compared to aluminum alloy material. With the increasing value of density parameter, the radial stress increases in the intermediate surface of the hyperbolic rotating disk. Results have been discussed numerical and depicted graphically.

MSC:

74C15	Large-strain, rate-independent theories of plasticity (including nonlinear plasticity)
74K30	Junctions
74G10	Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.) of equilibrium problems in solid mechanics

Keywords:

finite Euler-Almansi strain; yielding stage; angular speed; stress distribution; rubber material; density parameter

Full Text: DOI

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