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Description

In the present paper we examine analytically the steady hydrodynamic flow of a power-law non-Newtonian fluid from a rotating disk to a saturated non-Darcian porous medium. The equations for radial, azimuthal and axial momentum are formulated with additional drag force terms for the Darcian linear porous impedance and the second order Forchheimer resistance. The disk is assumed to be of infinite extent and rotates at a constant angular velocity about the z-axis which is perpendicular to it. The disk lies in the xy plane. Using the Mitschka transformations we non-dimensionalize the governing equations and also use a Von Karman velocity field model to reduce the mathematical model to a triplet of ordinary differential equations in terms of the mass conservation, radial momentum and azimuthal momentum. Numerical solutions are obtained using shooting quadrature and the influence of Darcian parameter …

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