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Rashad, A.M., Mallikarjuna, B., Chamkha, A.J., Raju, S.H.

Thermophoresis effect on heat and mass transfer from a rotating cone in a porous medium with thermal radiation
(2016) *Afrika Matematika*, 27 (7-8), pp. 1409-1424. Cited 10 times.

Abstract
This work is devoted to study the combined effects of thermal radiation and thermophoresis on heat and mass transfer by mixed convection over a vertical rotating cone in a fluid saturated porous medium. The governing non-linear partial differential equations are transformed into a system of coupled non-linear ordinary differential equations using similarity transformations and then solved numerically using the Runge–Kutta method and Newton–Raphson method. The numerical results are compared and found to be approximately better than previously published results, Hering and Grosh (ASME J Heat Transf 85:29–34, 1963) and Himasekhar et al. (Int Commun Heat Mass Transf 16:99–106, 1989) as special cases of the present work. The local tangential and azimuthal skin friction coefficients, dimensionless wall thermophoretic velocity, local Nusselt and Sherwood numbers are presented graphically for different values of Darcy number, thermophoretic coefficient, thermal radiation parameter, and discussed to depict interesting features of the solutions. © 2016, African Mathematical Union and Springer-Verlag Berlin Heidelberg.

2-s2.0-85013951111
Document Type: Article
Publication Stage: Final
Source: Scopus