Abstract

In the present study, an analysis is carried out to study two-dimensional, laminar boundary layer flow and mass transfer of a micropolar chemically-reacting fluid past a linearly stretching surface embedded in a porous medium. Such a study finds important applications in geochemical systems and also chemical reactor process engineering. The non-linear partial boundary layer differential equations, governing the problem under consideration, have been transformed by a similarity transformation into a system of ordinary differential equations, which is solved numerically by using the galerkin finite element method. The numerical outcomes thus obtained are depicted graphically to illustrate the effect of different controlling parameters on the dimensionless velocity, temperature and concentration profiles. Comparisons of finite element method and finite difference method is also presented in order to test the accuracy of the methods and the results obtained are found to have an excellent agreement. Finally, the numerical values for quantities of physical interest like local Nusselt number and skin friction are
also presented in tabular form.

References


- Sakiadis B. C., Boundary layer behaviour on continuous solid surface II: The boundary layer on a continuous flat surface, A I Chem E J. 7 (1961b) 221-225.
Heat and Mass Transfer of a Chemically Reacting Micropolar Fluid Over a Linear Streaching Sheet in Darcy Forchheimer Porous Medium

Eringen A. C. , Theory of Thermomicrofluids, Mathematical analysis and Applications Journal 38 (1972) 480-496.


Index Terms

Computer Science

Applied Sciences
Keywords
Galerkin Finite Element Method  Skin Friction  Linearly Stretching Sheet  Chemically Reacting Fluid