

Unsteady mixed convection stagnation-point flow over a plate moving along the direction of flow impingement

ABSTRACT

Purpose: The purpose of this paper is to present the results of an analysis performed to study unsteady mixed convection at the stagnation point flow over a plate moving along the direction of flow impingement. The similarity transformations are used to transform the governing nonlinear partial differential equation to a system of an ordinary differential equation.

Design/methodology/approach: The transformed equations are then solved numerically by a shooting technique together with `bvp4c` function.

Findings: The numerical results are compared with the corresponding results from previous researchers. The effects of the unsteadiness Parameter A , Prandtl number Pr , mixed convection parameter λ for plane ($m = 0$) and axisymmetric ($m = 1$) flow on the shear stress or the skin friction and heat transfer coefficients, as well as the velocity and temperature profiles, are presented and discussed.

Originality/value: Dual solutions for the opposing flow and multiple solutions for the assisting flow are found

Keyword: Numerical solution; Moving plate; Stagnation point flow; Unsteady mixed convection flow