

Unsteady flow and heat transfer across a stretching surface

ABSTRACT

The heat transfer characteristics of an unsteady uniform flow across a stretching surface in an arbitrary direction are investigated where the unsteadiness is due to the impulsive motion of the stretching surface. The governing partial differential equations are solved numerically using an implicit finite-difference scheme for the whole transient from the early or initial unsteady-state flow to the final steady-state flow. The effects of Prandtl number on the heat transfer characteristics with isothermal flat plate are presented in this paper. It is found that there is a smooth transition from the small-time solution (initial unsteady flow) to the large-time solution (final steady-state flow) for the local Nusselt number.

Keyword: Unsteady flow; Heat transfer; Stretching surface; Numerical solution