

## **Boundary layer flow beneath a uniform free stream permeable continuous moving surface in a nanofluid**

### **ABSTRACT**

The main purpose of this paper is to introduce a boundary layer analysis for the fluid flow and heat transfer characteristics of an incompressible nanofluid flowing over a permeable isothermal surface moving continuously. The resulting system of non-linear ordinary differential equations is solved numerically using the fifth-order Runge-Kutta method with shooting techniques using Matlab and Maple softwares. Numerical results are obtained for the velocity, temperature, and concentration distributions, as well as the friction factor, local Nusselt number, and local Sherwood number for several values of the parameters, namely the velocity ratio parameter, suction/injection parameter, and nanofluid parameters. The obtained results are presented graphically in tabular forms and the physical aspects of the problem are discussed.

**Keyword:** Suction/injection; Moving surface; Nanofluid; Runge-Kutta method; Shooting techniques; Dual solutions