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Nanofluid stagnation-point flow using Tiwari and Das model over a stretching/shrinking sheet with suction and slip effects

Absract
In this paper, we considered the stagnation point flow and heat transfer of nanofluid over the stretching/shrinking surface by utilizing of Tiwari and Das nanofluid model. Additionally, the impact of suction and the first order slip likewise have been taken into the account. The system of governing partial differential equations (PDEs) is changed into the system of non-linear ordinary differential equations (ODEs) by means of similarity transformation. The resultant ODEs are solved by using BVP solver (bvp4c) in MATLAB software. The impact of some physical parameters, for example the suction parameter and the slip parameter on the skin friction coefficients and the local Nusselt number as well as the temperature and velocity profiles have been investigated, tabulated and graphically presented. These profiles and variations demonstrate that there exist dual solutions for a specific range of the stretching/shrinking parameter. Both suction and slip effects has enhance the local Nusselt number which represent heat transfer rate at the surface. It is also found that inclusion of both suction and slip effects expands the range of the dual solutions exist. The existence of the dual solutions only occurs in in the shrinking region. The flow separation in the boundary layer delay due to suction and slip effects imposed in the boundary condition.

Keywords
Dual solutions; Heat transfer; Nanofluid; Slip; Stagnation point flow; Suction