

Classical problem of steady boundary layer flow of nanofluid over an exponentially permeable shrinking sheet in presence of slip is investigated. The model used for nanofluid includes Brownian motion and thermophoresis effects. The governing equations for momentum, energy, and nanofluid solid volume fraction are transformed to ordinary differential equations with the help of similarity transformations and then solved numerically using fourth order Runge–Kutta method with shooting technique. It is found that the governing parameters, viz. the suction/blowing parameter, velocity slip, thermal and mass slip parameters, Brownian motion parameter, thermophoresis parameter, Prandtl number, and Lewis number significantly affect the flow field, heat, and mass transfer. The results obtained indicate that the dual solutions exist for certain values of the mass suction parameter. Velocity increases whereas the temperature and nanoparticle volume fraction decrease due to suction through the porous sheet. It is noted that with the increase in velocity slip fluid velocity increases whereas temperature and concentration decrease. Due to increase in thermal slip and mass slip both temperature and concentration decrease.

Classical problem of steady boundary layer flow of nanofluid over an exponentially permeable shrinking sheet in presence of slip is investigated. The model used for nanofluid includes Brownian motion and thermophoresis effects. The governing equations for momentum, energy, and nanofluid solid volume fraction are transformed to ordinary differential equations with the help of similarity transformations and then solved numerically using fourth order Runge–Kutta method with shooting technique. It is found that the governing parameters, viz. the suction/blowing parameter, velocity slip, thermal and mass slip parameters, Brownian motion parameter, thermophoresis parameter, Prandtl number, and Lewis number significantly affect the flow field, heat, and mass transfer. The results obtained indicate that the dual solutions exist for certain values of the mass suction parameter. Velocity increases whereas the temperature and nanoparticle volume fraction decrease due to suction through the porous sheet. It is noted that with the increase in velocity slip fluid velocity increases whereas temperature and concentration decrease. Due to increase in thermal slip and mass slip both temperature and concentration decrease.