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**Study of the boundary layer heat transfer of nanofluids over a stretching sheet: Passive control of nanoparticles at the surface**
(2014) *Canadian Journal of Physics*, 93 (7), pp. 725-733. Cited 15 times.

**Abstract**
The boundary layer heat and mass transfer of nanofluids over an isothermal stretching sheet is analyzed using a drift-flux model. The relative slip velocity between the nanoparticles and the base fluid is taken into account. The nanoparticles volume fractions at the surface of the sheet are considered to be adjusted passively. The thermal conductivity and the dynamic viscosity of the nanofluid are considered as functions of the local volume fraction of the nanoparticles. A non-dimensional parameter, heat transfer enhancement ratio, is introduced, which shows the alteration of the thermal convective coefficient of the nanofluid compared to the base fluid. The governing partial differential equations are reduced into a set of nonlinear ordinary differential equations using appropriate similarity transformations and then solved numerically using the fourth-order Runge-Kutta and Newton-Raphson methods along with the shooting technique. The effects of six non-dimensional parameters, namely, the Prandtl number of the base fluid Prbf, Lewis number Le, Brownian motion parameter Nb, thermophoresis parameter Nt, variable thermal conductivity parameter Nc and the variable viscosity parameter Nv, on the velocity, temperature, and concentration profiles as well as the reduced Nusselt number and the enhancement ratio are investigated. Finally, case studies for Al2O3 and Cu nanoparticles dispersed in water are performed. It is found that increases in the ambient values of the nanoparticles volume fraction cause decreases in both the dimensionless shear stress f'' (0) and the reduced Nusselt number Nur. Furthermore, an augmentation of the ambient value of the volume fraction of nanoparticles results in an increase the heat transfer enhancement ratio hnf/hbf. Therefore, using nanoparticles produces heat transfer enhancement from the sheet. © 2015 Published by NRC Research Press.

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