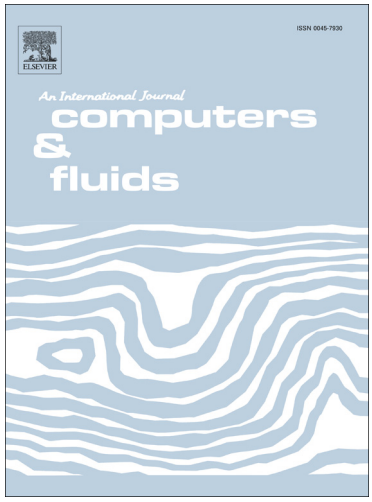

Boundary Layer Flow of Nanofluids with Variable Thermal Conductivity: Natural-Convection Flow over a Vertical Cone in Porous Media

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Abstract

This paper attempts to theoretically analyze the effects of nanoparticles concentration gradient on the natural convection boundary layer flow of nanofluids around a vertical cone placed in a porous medium. The slip of nanoparticles is because of the Brownian motion and thermophoresis forces. The viscosity and the thermal conductivity of nanofluid are considered as a function of local volume fraction of nanoparticles. Two mathematical processes are performed. The first step is the simplification of the governing partial differential equations using appropriate similarity variables. The second step is the numerical solution of the obtained ordinary differential equations. Furthermore, based on the Buongiorno's model, the new definition of the reduced Nusselt and Sherwood numbers is presented in details. The results reveal that the reduced Nusselt number would increase with increase of viscosity parameter and decrease with an increase of thermal conductivity parameter.