عنوان مقاله:

A Characteristic-based Numerical Simulation of Water-titanium Dioxide Nano-fluid in Closed Domains

محل انتشار:

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خلاصه مقاله:

A new characteristic-based method is developed and used for solving the mixed and forced convection problems. The nano-fluid flow with heat transfer is simulated with a novel characteristic-based scheme in closed domains with different aspect ratios. For this purpose, a FORTRAN code has been written and developed. Water as a pure fluid and water-titanium dioxide as a nano-fluid were considered. The governing equations are solved by the finite volume utilizing a characteristic-based scheme for the convective fluxes. The simulation is done at Grashof numbers from 100 to 104, Reynolds numbers from 100 to 1000, and volume fractions of nano-particles from 0% to 10%. Streamlines, isotherms, friction factor, and mean Nusselt number are obtained in various conditions. The convective behavior of nano-fluid is explored as a function of several parameters, such as Grashof number and geometrical parameters. .Results indicate that the mean Nusselt number for the nanofluid is up to 23% more than that of pure water

کلمات کلیدی:

Titanium dioxide, nano-fluid, Nusselt Number, friction factor, Numerical method