

Numerical Study of Natural Convection Heat Transfer Performance in an Inclined Cavity: Nanofluid and Random Temperature

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Abstract : Natural convection of a nanofluid consisting of water and nanoparticles (Ag or TiO₂) in an inclined enclosure cavity, has been studied numerically, heated by a (random temperature, based on the random function). The governing equations are solved numerically using the finite-volume. Results are presented in the form of streamlines, isotherms, and average Nusselt number. In addition, a parametric study is carried out to examine explicitly the volume fraction effects of nanoparticles ($\Psi = 0.1, 0.2$), the Rayleigh number ($Ra = 103, 104, 105, 106$), the inclination angle of the cavity (égale à $0^\circ, 30^\circ, 45^\circ, 90^\circ, 135^\circ, 180^\circ$), types of temperature (constant, random), types of (NF) (Ag and TiO₂). The results reveal that (NPs) addition remarkably enhances heat transfer in the cavity especially for ($\Psi = 0.2$). Besides, the effect of inclination angle and type of temperature is more pronounced at higher Rayleigh number.

Keywords : nanofluid, natural convection, inclined cavity, random temperature, finite-volume

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