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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 (Ψ= 0.1, 0.2), the Rayleigh number (Ra=103, 104, 105, 106),the inclination angle of the cavity(égale à 0°, 30°, 45°, 90°, 135°, 180°), types of temperature (constant ,random), types of (NF) (Ag andTiO2). The results reveal that (NPs) addition remarkably enhances heat transfer in the cavity especially for (Ψ= 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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