

عنوان مقاله:

MHD turbulent natural convection flow of CuO-water nanofluid inside a cavity with volumetric radiation

محل انتشار:

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خلاصه مقاله:

In present study, the natural convective heat transfer in the turbulent flow of CuO-water nanofluid with volumetric radiation and magnetic field inside a tall cavity has been numerically investigated. For validating of the present research, a comparison has been carried out with the laminar natural convection flow under the influence of magnetic field and radiation effects and also. the natural turbulent convection flow of previous studies and a proper coincident has been achieved. The turbulence equations have been solved by using SST k-OJ model. For discretizing the equations, the second order upwind method has been used. The thermophysical properties of CuO-water nanofluid have been considered variable with temperature and the effects of Brownian motion of nanoparticles have been considered. By increasing volume fraction and Hartmann number, the average Nusselt number enhances and reduces, respectively. Results show that the volume fractions of 0 to 1%, has the maximum rate of heat transfer enhancement and the maximum amounts of average Nusselt number enhancement for vertical, inclined and horizontal cavity are respectively, 11.05%, 14.87% and 17.03%. Also, the maximum amounts of average Nusselt number enhancement in volume fractions of 1% to 4% in the vertical, inclined and horizontal cavity are respectively, 2.96%, 2.50% and 4.90%. Also, the results show that the inclined cavity with deviation angle of 45°, comparing to the vertical and horizontal enclosure, has better thermal performance.

کلمات کلیدی:

Turbulent natural convection, CuO-water nanofluid, Magneto-hydrodynamics. Volumetric radiation

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