

Free convection heat transfer in a square cavity filled with a porous medium saturated by a water-based nanofluid

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ABSTRACT

The effect of the concentration of nanoparticles on the steady free convection in a square cavity filled with a nanofluid-saturated porous medium has been investigated numerically. The top and bottom of horizontal walls of the cavity are considered adiabatic, while the vertical walls are kept at constant, but different, temperatures. The mathematical model consists in a set of partial differential equations along with the corresponding boundary conditions. These equations were written in a dimensionless form and were solved numerically using a finite-difference scheme discretization combined with the Gauss-Seidel technique. Results are presented in terms of streamlines, isotherms and local and averaged Nusselt numbers for different values of the involved parameters

Key-Words: free convection, porous media, nanofluid, thermophoresis, diffusiophoresis