

ABSTRACT:

In this paper, a double-population thermal lattice Boltzmann was applied to solve two dimensional, incompressible, thermal fluid flow problems. The simplest lattice BGK D2Q4 model was applied to determine the temperature field while D2Q9 for the density and velocity fields. The simulation of natural convection from a concentrically and eccentrically placed inner heated cylinder inside cold outer cylinder with Prandtl number 0.71 and Rayleigh number 5×10^5 was observed that the combination of D2Q4 and D2Q9 were carried out and discussed quantitatively. It was able to reproduce the effect of buoyancy force in the system. We also found that the flow pattern including the boundary layers and vortices with heat transfer mechanisms is significantly influenced by the position of heated cylinder in the enclosure and excellent comparisons with previous studies.