

The solution of a highly nonlinear fluid dynamics was found for low Prandtl number fluids like mercury, sodium, potassium, and sodium-potassium alloy (NaK) at different Rayleigh number to test the efficiency of an algorithm based on lattice Boltzmann method. Because the inertial force is the main domination in the flow, and the viscous effects are limited to the very thin boundary layers so there is highly nonlinear flow. The algorithm used is double SRT (single relaxation time) thermal lattice Boltzmann method. SRT method was used for a D2Q9 model for the velocity field and SRT method for a D2Q5 model for the temperature field. The results obtained are steady state solution for some cases and oscillatory solution for some other. The results are the streamlines of the velocity field, isotherm for the temperature field and Nusselt number for the heat transfer. From the simulation, it is seen that for the same Rayleigh number lower Prandtl number weak the effect of convection, make higher oscillation amplitude and make a longer period of oscillation .but for the same .Prandtl number with higher Rayleigh number make more Convection effect