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DETERMINATION OF THE PARAMETERS THAT CONTROL THE LAMINAR MIXED CONVECTION IN A SQUARE CAVITY (*Pr* = 0.015)

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ABSTRACT This work consists to a parametric study of heat transfer in laminar mixed convection inside a square cavity. Our objective is the determination of a parameter that able to locate the transition between the forced, mixed and natural convection for a low Prandtl number fluid (*Pr = 0.015*). The proposed geometry is a cavity with moving left vertical wall which is maintained to cold temperature and with the right fixed wall at hot temperature. The horizontal walls are adiabatic. The governing equations of this problem are: the equation of conservation of mass, the Navier Stokes equations and energy conservation equation. These differential equations are discretized by the finite volume method on a staggered grid and the *SIMPLE* algorithm was used for the iterative procedure.

The numerical simulations were made for a wide range of Reynolds numbers ($1 \leq Re \leq 600$), and Grashof ($29.2 \leq Gr \leq 685800$). The frontiers of transition from one regime to another regime of convection (forced-mixed and mixed-natural) were determined by a modified Richardson Number. Finally, we found that the parameter which specifies the natural convection regime is $Gr/Re^{1,\,58194}$ and for the forced convection regime is $Gr/Re^{1,\,50235}$.