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Analysis of heat transfer in a closed cavity, ventilated inside

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In this work, we presented a numerical study of the phenomenon of heat transfer through the laminar, incompressible and steady mixed convection in a closed square cavity with the left vertical wall of the cavity being subjected to a warm temperature, while the right wall is considered to be cold. The horizontal walls are assumed adiabatic. The governing equations were discretized by finite volume method on a staggered mesh and the SIMPLER algorithm was used for the treatment of velocity-pressure coupling. The numerical simulations were performed for a wide range of Reynolds numbers. 1, 10, 100, and 1000 numbers are equal to 0.01,0.1 Richardson, 0.5,1 and 10.The analysis of the results shows a flow bicellular (two cells), one is created by the speed of the fan placed in the inner cavity, one on the left is due to the difference between the temperatures right wall and the left wall. Knowledge of the intensity of each of these cells allowed us to get an original result as well as the values obtained from each of Nusselt convection which allow knowing the rate of heat transfer in the cavity. Finally, we find that there is a significant influence on the position of the fan on the heat transfer (Nusselt evolution) for values of Reynolds studied and for low values of Richardson handed this influence is negligible for high values of the latter.

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