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Natural convection and entropy generation in a nanofluid filled cavity with thick bottom wall: Effects of non-isothermal heating

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Abstract

In the present work, entropy generation due to natural convection in nanofluid (water-Al_2O_3) filled a square cavity with thick bottom wall is studied numerically. The thick bottom wall of the cavity is heated via non-isothermal heater, which has sinusoidal function, and top wall is cooled isothermally. The vertical walls are kept adiabatic. The finite volume method is used to solve the governing equations of flow and heat transfer. Results are presented in terms of streamlines, isotherms, local and average Nusselt numbers for Rayleigh number Ra (10^4-10^6),solid volume fraction of nanoparticles ϕ (0-0.1), and thickness of the bottom wall h^*(0.05-0.15).The obtained results show that the average Nusselt number decreases with increasing of the bottom wall's thickness.

Keywords: Entropy generation, Natural convection, Nano fluid, Cavity, thick wall.