

Documents

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Ferrofluid convection in a lid-driven cavity

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Abstract

This study numerically investigates the mixed convection of ferrofluids in a partially heated lid driven square enclosure. The heater is located to the left vertical wall and the right vertical wall is kept at constant lower temperature while other walls of the cavity are assumed to be adiabatic. The governing equations are solved with Galerkin weighted residual finite element method. The influence of the Richardson number (between 0.01 and 100), heater location (between 0.25 H and 0.75H), strength of the magnetic dipole (between 0 and 4), and horizontal location of the magnetic dipole source (between -2H and -0.5H) on the fluid flow and heat transfer are numerically investigated. It is found that local and averaged heat transfer deteriorates with increasing values of Richardson number and magnetic dipole strength. The flow field and thermal characteristics are sensitive to the magnetic dipole source strength and its position and heater location. © 2018 Trans Tech Publications, Switzerland.

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