عنوان مقاله:

Heat Transfer of Non-Newtonian Dilatant Power Law Fluids in Square and Rectangular Cavities

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خلاصه مقاله:

Steady two-dimensional natural convection in fluid filled cavities is numerically investigated for the case of non-Newtonian shear thickening power law liquids. The conservation equations of mass, momentum and energy under the assumption of a Newtonian Boussinesq fluid have been solved using the finite volume method for Newtonian and non-Newtonian fluids. The computations were performed for a Rayleigh number, based on cavity height, of ۱۰۵ and a Prandtl number of ۱۰۰. In all of the numerical experiments, the channel is heated from below and cooled from the top with insulated side-walls and the inclination angle is varied. The simulations have been carried out for aspect ratios of ۱ and ۴. Comparison between the Newtonian and the non-Newtonian cases is conducted based on the dependence of the average Nusselt number on angle of inclination. It is shown that despite significant variation in heat transfer rate both Newtonian and non-Newtonian fluids exhibit similar behavior with the transition from multi-cell flow structure to a single-cell regime.

کلمات کلیدی:
Cavity, law fluids, Power, Numerical, Heat transfer

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