Heat transfer augmentation in an inclined lid-dirven triangular enclosure utilizing nanofluids in forced convection flows

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Abstrak

ABSTRAK

Heat transfer enhancement in a two-dimensional inclined lid-driven triangular enclosure utilizing cu-water nanofluids is investigated for various relevant parameters. A model is developed to analyze heat transfer performance of nanofluids inside an enclosure taking into account the force convection parameter, namely Reynolds number, Re. The transport equations are solved numerically using the Galerkin finite element method. Comparisons with previously published work on the basis of special cases are performed and found to be in excellent agreement. Results are obtained for a wide range of parameters such as the Richardson number, Ri, and Reynolds number, Re. Copper-water nanofluids are used with Prandtl number, Pr = 6.2 and Reynolds number, Re is varied from 100 to 500. The streamlines, isotherm plots and the variation of the average Nusselt number at the hot surface as well as average fluid temperature in the enclosure are offered and discussed in detailed. It is observed that the force convection parameter strongly influenced the fluid flow and heat transfer in the enclosure at the considered three convective regimes. Furthermore, the variation of the average Nusselt number at the heated surface is found to increase when Re increases and average fluid temperature in the cavity decreases with the raise of Re.