Heat transfer through a wavy conducting partition placed vertically in a square cavity

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Abstract

A computational investigation has been carried out for the coupled thermal boundary layers on both sides of a wavy partition placed vertically in the middle of a square enclosure. The working fluid is considered as water which is initially at rest. A sudden temperature difference between two fluid zones of the enclosure has been imposed to trigger the natural convection process. The detailed development of the couple thermal boundary layers is observed. Time dependent features of the coupled thermal boundary layers as well as the overall natural convection flow in the partitioned enclosure have been discussed and compared with the non-partitioned enclosure. The effect of waviness on heat transfer and fluid flow is investigated. The numerically obtained results for the case of straight vertical partitioned is compared with existing results available in the literature. Moreover, heat transfer as a form of local and overall average Nusselt number through the coupled thermal boundary layers and the boundary walls is examined.

Key Words: Conducting wavy partition; heat transfer; coupled thermal boundary layer; square enclosure