

Numerical Study of Natural Convection in a Triangular Enclosure as an Attic for Different Geometries and Boundary Conditions

Authors : H. Golchoobian, S. Saedodin, M. H. Taheri, A. Sarafraz

Abstract : In this paper, natural convection in an attic is numerically investigated. The geometry of the problem is considered to be a triangular enclosure. ANSYS Fluent software is used for modeling and numerical solution. This study is for steady state. Four right-angled triangles with height to base ratios of 2, 1, 0.5 and 0.25 are considered. The behavior of various parameters related to its performance, including temperature distribution and velocity vectors are evaluated, and graphs for the Nusselt number have been drawn. Also, in this study, the effect of geometric shape of enclosure with different height-to-base ratios has been evaluated for three types of boundary conditions of winter, summer day and one another state. It can be concluded that as the bottom side temperature and ratio of base to height of the enclosure increases, the convective effects become more prominent and circulation happened.

Keywords : enclosure, natural convection, numerical solution, Nusselt number, triangular

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