

Entropy Generation Analyze Due to the Steady Natural Convection of Newtonian Fluid in a Square Enclosure

Authors : T. T. Naas, Y. Lasbet, C. Kezrane

Abstract : The thermal control in many systems is widely accomplished applying mixed convection process due to its low cost, reliability and easy maintenance. Typical applications include the aircraft electronic equipment, rotating-disc heat exchangers, turbo machinery, and nuclear reactors, etc. Natural convection in an inclined square enclosure heated via wall heater has been studied numerically. Finite volume method is used for solving momentum and energy equations in the form of stream function-vorticity. The right and left walls are kept at a constant temperature, while the other parts are adiabatic. The range of the inclination angle covers a whole revolution. The method is validated for a vertical cavity. A general power law dependence of the Nusselt number with respect to the Rayleigh number with the coefficient and exponent as functions of the inclination angle is presented. For a fixed Rayleigh number, the inclination angle increases or decreases is found.

Keywords : natural convection in enclosure, inclined enclosure, Nusselt number, entropy generation analyze

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