

HEAT TRANSFER FROM THE COLD WALL OF A SQUARE CAVITY TO THE HOT ONE BY OSCILLATORY NATURAL CONVECTION

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ABSTRACT The periodical natural convection in an inclined square enclosure has been numerically studied. One of the cavity sides has been maintained at a constant temperature, and the temperature of the opposite wall has been varied by the sine law. The mean value of this temperature in a period was lower than the given constant temperature. The other two walls of the enclosure have been adiabatic. The system of Navier-Stokes equations in Boussinesq approximation has been solved numerically by control volume method with SIMPLER algorithm. The solutions have been obtained for Grashof number equaled to $5 \cdot 10^5$ and Prandtl number equaled to unity in a wide range of the oscillation frequency variation. The heat transfer dependency on oscillation frequency has been studied for different values of inclination angle. It has been found that there is a possibility of heat transferring from the hotter wall to the colder one in a whole range of the problem parameters. The possible causes of such a phenomenon has been analysed.