

EFFECT OF ASPECT RATIO AND INCLINATION ANGLE ON FLUID FLOW AND HEAT TRANSFER IN RECTANGULAR ENCLOSURES

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In last decades, natural convection in tall enclosures is studied extensively due to its wide range of engineering applications such as airflow in rooms and heat transfer through building sections. However, most of the studies ignore radiative heat transfer. In this work, fluid flow and heat transfer considering radiation also in rectangular enclosures whose vertical walls are differentially heated and horizontal walls are insulated are studied numerically. Computations are performed for Rayleigh numbers ($10^3 \leq Ra \leq 10^5$), aspect ratios ($1 \leq AR \leq 20$) and emissivity values ($0 \leq \varepsilon \leq 1$). Besides, in order to investigate flow pattern and heat transfer in inclined enclosures, simulations are carried out for various inclination angles ranging from 0° to 180° with 30° increments. It is assumed that gas in the cavity does not participate radiative heat transfer and radiation exchange between solid surfaces only is considered. Results show that investigated parameters has significant effect of the flow pattern and heat transfer.

Keywords: aspect ratio, inclination angle, free convection, radiation

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