عنوان مقاله:

Effect of Thermal Conductivity and Emissivity of Solid Walls on Time-Dependent Turbulent Conjugate Convective-Radiative Heat Transfer

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خلاصه مقاله:

In the present study, the conjugate turbulent free convection with the thermal surface radiation in a rectangular enclosure bounded by walls with different thermophysical characteristics in the presence of a local heater is numerically studied. The effects of surface emissivity and wall materials on the air flow and the heat transfer characteristics are the main focus of the present investigation. The conjugate convective heat transfer for the fluid (air), described in terms of linear momentum, continuity, and energy equations combined with k-ε turbulence model, is predicted by using the finite difference method. The results for the isotherms, streamlines, and average Nusselt numbers along the heat source are presented. The numerical experiments show that an increase in thermal conductivity of solid walls illustrates the enhancement of heat transfer. Eventually, the main result obtained in this work provides a good technical support for the development and research of energy-efficient building materials.

کلمات کلیدی:

Natural convection, Surface radiation, Turbulence, Heat source, thermal conductivity, Finite difference method

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