عنوان مقاله:

Interaction of laminar natural convection and radiation in an inclined square cavity containing participating gases

نویسندگان:

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خلاصه مقاله:

Two-dimensional numerical study of flow and temperature fields for laminar natural convection and radiation in the inclined cavity is performed in the present work. The walls of the square cavity are assumed kept at constant temperatures. An absorbing, emitting, and scattering gray medium is enclosed by the opaque and diffusely emitting walls. The set of governing equations, including conservation of mass, momentum, and energy for fluid flow, is solved numerically by the CFD method, while radiation computation is based on the numerical solution of the radiative transfer equation. The finite volume method has been adopted to solve the governing equations, and the discrete ordinates method (DOM) is used to model the radiative transfer in the absorbing-emitting medium. The effects of Rayleigh number from 103 to 106 and inclination angle in a broad range from 0 to 90o on temperature and velocity distributions and Nusselt numbers are investigated. It was found that the total heat transfer in the cavity is increased under thermal radiation, and variation of inclination angle causes a sweep behavior in the flow pattern inside the cavity.

کلمات کلیدی:
Laminar Natural Convection Flow, Inclined Cavity, Radiation, DOM

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