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# Numerical study of air flow and heat transfer in a two-dimensional enclosure with floor heating

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## Abstract

In this paper, two-dimensional modeling for floor heating as well as concentrated heating, were performed numerically for an enclosure instead of a room. Governing equations for turbulent incompressible flow (continuity, momentum and energy equations) coupled with radiation, were solved using Boussinesq approximation and control volume approach. The modified  $k - \varepsilon$  model for turbulence and the DO model for radiation were adopted within the framework of SIMPLE algorithm. Different physical boundary conditions such as air absorptivity, floor temperature, wall temperatures and window dimension were applied and results for floor heating were compared with those obtained for concentrated heating. Results for the floor heating show that 74% of heat transfer from floor to the walls and the air in the room was in the form of radiation and the rest was due to convection. Study of temperature fields

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