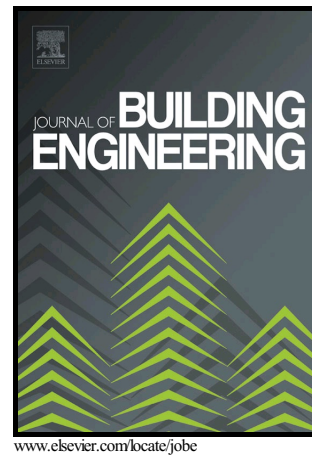


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A synchronizing thermal model based on three kinds of radiant models to compute interior air temperature and interior wall temperature

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Abstract

The interior air temperature and interior wall temperature are of great importance to calculate air conditioning load and study thermal comfort. Many researchers have been conducted to investigate building heat transfer model. In this paper, a synchronizing thermal model based on three kinds of radiant models is built to compute interior air temperature and interior wall temperature. The thermal conduction, convection and radiation occur simultaneously on the interior walls of buildings, and the radiation heat transfer in the thermal model is built with three kinds of radiant models severally. Under various conditions with changed wall heat flow and supply air volume, interior air temperature and interior wall temperature are computed by synchronizing thermal model. The calculated results of interior air temperature based on three kinds of radiant models fit closely with measured data. The computed results of interior wall temperature based on Gebhart radiant model and effective radiant model are quite close and they are more accurate than those based on direct radiant model. Obviously, the Gebhart radiant model distinctly owns equal computed precision comparing to effective radiant model and it has less calculated quantities. So the Gebhart radiant model has obvious advantages to establish theoretical model in building heat transfer research.

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