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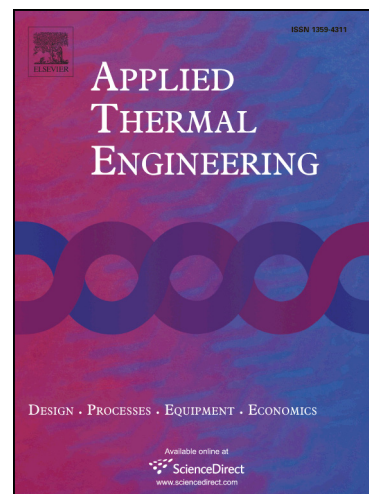
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Numerical simulation of thermal behaviors of a clothed human body with
evaluation of indoor solar radiation

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Abstract

Solar radiation is a valuable green energy, which is important in achieving a successful building design for thermal comfort in indoor environment. This paper considers solar radiation indoors into the transient thermal transfer models of a clothed human body and offers a new numerical method to analyze the dynamic thermal status of a clothed human body under different solar radiation incidences. The evaluation model of solar radiation indoors and a group of coupled thermal models of the clothed human body are developed and integrated. The simulation capacities of these integrated models are validated through a comparison between the predicted results and the experimental data in reference. After that, simulation cases are also conducted to show the influence of solar radiation on the thermal status of individual clothed body segments when the human body is staying indoors in different seasons. This numerical simulation method provides a useful tool to analyze the thermal status of clothed human body under different solar radiation incidences indoors and thus enables the architect to efficiently utilize the green solar energy in building development.

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