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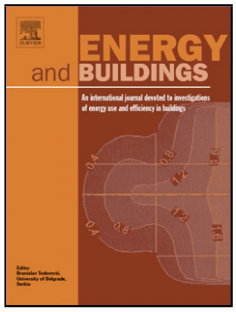

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On the effect of material uncertainties in envelope heat transfer simulations

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Abstract

The accuracy of energy simulation codes is considerably increasing and it follows that the inputs need to be properly defined and technically characterized. Despite the vast research on uncertainty and sensitivity analysis, little is known about the extent to which a single thermophysical property affects the simulation outcomes. This information can guide the manufacturers of building materials towards improved quality controls and the energy modelers to deeply investigate the input data. This study focuses on the effect of uncertain thermophysical properties on the numerical solutions of the heat equation. A sensitivity analysis applied to several walls in different climates is carried out by using a Monte Carlo technique. Furthermore, the uncertainty propagation is investigated in the finite difference method (FD) and in the conduction transfer functions approach (CTF). For some configurations this study points out that the aleatory uncertainty of the material

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