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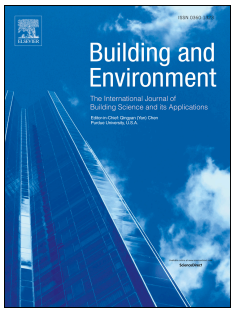

Literature review on pressure–velocity decoupling algorithms applied to built-environment CFD simulation

Haidong Wang, Hui Wang, Feng Gao, Pengzhi Zhou, Zhiqiang (John) Zhai

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Literature review on pressure–velocity decoupling algorithms applied to built-environment CFD simulation

Haidong Wang[1,*], Hui Wang[1], Feng Gao[1], Pengzhi Zhou[1], Zhiqiang (John) Zhai[2,*]
[1]School of Environment and Architecture, University of Shanghai for Science and Technology, 516 Jungong Road, Shanghai, China, 200093
[2]Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Colorado, 80309-0428, USA
*Corresponding author: Haidong Wang[1], whd@usst.edu.cn; Zhiqiang (John) Zhai[2], john.zhai@colorado.edu

Abstract

For decades, computational fluid dynamics (CFD) has been applied to built-environment related simulations such as those of building ventilation, indoor airflow, and contaminant transportation. The pressure–velocity decoupling algorithm employed in CFD to solve momentum equation(s) exerts significant influence on the convergence speed and computational resource requirement. In order to identify the opportunities to improve CFD performance for built-environment simulation, a review is conducted on the commonly used pressure–velocity decoupling algorithms in indoor environment CFD modeling, with the aim of summarizing the general status and trends of the application and development of the decoupling algorithms. The study categorizes the primary algorithms based on the advantages and disadvantages of each reviewed algorithm and the applications of each analyzed algorithm. The review indicates an explicit prevalence of the usage of the SIMPLE algorithm and its variants in indoor-environment CFD simulation, which is a combined outcome of the superiority of such algorithms and their wide availability in commonly used CFD