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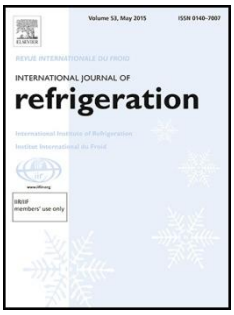

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Numerical simulation on time-mean characteristics of flow and heat transfer of in-line double-column cylinders in the transitional flow using compound grid system

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Highlights

- The compound grid system was used in in-line double-column cylinders.
- There are the time-mean effect and the statistical fluctuation effect.
- Flow instability improves the effective Re and the temperature difference.
- Taking away thermal fluid and bringing cold fluid were identified.

Abstract

A computational model using a compound grid system for the in-line double column cylinders was developed to investigate the mechanisms of heat transfer enhancement in transitional flow. The results show that flow instability of wake flow causes into two different effects, including time-mean effect and statistical fluctuation effect (i.e. obtained from the time-mean effect and the statistical fluctuation parameters, respectively), to enhance the heat transfer of the downstream cylinders. According to the clue, time-mean velocity and temperature in the wake of the upstream cylinders as the time-mean effect were investigated. It was found that fast recovery of velocity and temperature improves the effective Reynolds number and temperature difference. Then velocity cross-correction and velocity-temperature cross-correction in the wake of the upstream cylinders as statistical fluctuation effect

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