

Editorial

Numerical Simulation of Fluid Flow and Heat Transfer Processes

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Fluid flow and heat transfer processes are ubiquitous in nature and engineering. They exist in many aspects of industrial operations and daily life. Numerical simulations of these processes have been important methods for fundamental and applicable researches. This special issue focuses on the latest achievements in the two aspects. We received 63 active submissions from the United States of America, Canada, Mexico, France, Italy, Norway, Saudi Arabia, Turkey, China, Japan, Pakistan, Republic of Korea, and so forth and finally accepted 35 research articles to publish them in the special issue after peer reviews. The topics cover the researches having solid theoretical fundamentals including turbulent fluid flow and heat/mass transfer and the researches having strong backgrounds of applications.

In the field of turbulent fluid flow, 10 articles have been published. The following articles make efforts on direct numerical simulation (DNS), the Reynolds averaged Navier-Stokes (RANS) model, and large eddy simulation (LES) of turbulence. The article "*DNS study of the turbulent Taylor-vortex flow on a ribbed inner cylinder*" by T. Tsukahara et al. shows the investigation of turbulent Taylor-vortex flows over regularly spaced square ribs mounted on a rotating inner cylinder surface. The authors find that Taylor vortices remaining over roughened cylinder surfaces can lead to less pressure drag and an enhanced backflow in the recirculation zone. The article "*Turbulence modulation by small bubbles in the vertical upward channel flow*" by M. Pang et al. presents the mechanisms of the liquid turbulence modulation induced by

the addition of small bubbles. Intensified turbulence near the wall and slightly weakened turbulence in the channel region are discovered. In the article entitled "*A modified $k-\epsilon$ model for computation of flows with large streamline curvature*" by J.-L. Yin et al., the authors propose an improved RANS model for system rotation and streamline curvature effects and provide an effective way for turbulence modeling. In the article entitled "*Large eddy simulation of inertial particle preferential dispersion in a turbulent flow over a backward-facing step*" by B. Wang et al., LES of a turbulent flow with inertial particle dispersion over a backward-facing step is performed. The research conclusions are useful for further understanding the two-phase turbulence physics and establishing accurate engineering prediction models of particle dispersion. In the article "*Comparisons of LES and RANS computations with PIV experiments on a cylindrical cavity flow*" by W.-T. Su et al., RANS and LES methods are compared. The results show that LES is more suitable for predicting the complex flow characteristics inside complicated three-dimensional (3D) geometries. In the article "*Experimental validation of volume of fluid method for a sluice gate flow*" by A. A. Omer et al., two-dimensional (2D) open channel flow under a vertical sluice gate can be successfully analyzed by the volume of fluid (VOF) method-based modeling after the experimental validation. The following four articles focus on aerodynamics or drag reduction. "*Aerodynamic performance prediction of straight-bladed vertical axis wind turbine based on CFD*" by L. X. Zhang et al. demonstrates that the leading edge separation

Numerical Simulation Of Fluid Flow And Heat Mass Transfer Processes

Rachel Sandford



Numerical Simulation Of Fluid Flow And Heat Mass Transfer Processes:

Decoding **Numerical Simulation Of Fluid Flow And Heat Mass Transfer Processes**: Revealing the Captivating Potential of Verbal Expression

In an era characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its ability to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Numerical Simulation Of Fluid Flow And Heat Mass Transfer Processes**," a mesmerizing literary creation penned by way of a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring effect on our lives. In this appraisal, we shall explore the book's central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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