Special Issue

Kinetic Theory-Based Methods in Fluid Dynamics, 2nd Edition

Message from the Guest Editors

The kinetic theory is derived from statistical mechanics at the mesoscopic scale. The kinetic theory exceeds the macroscopic interpretations (expressed by the Navier–Stokes equations) in theoretical generality: no limits from the continuum assumption. Within the framework of kinetic theory, several approaches have been developed, including the lattice Boltzmann method (LBM), the discrete velocity method (DVM), the gas kinetic scheme (GKS), the unified gas-kinetic scheme (UGKS), the discrete unified gas kinetic scheme (DUGKS), the gas-kinetic unified algorithm (GKUA), the unified gas-kinetic wave-particle method (UGKWP), the simplified unified wave-particle method (SUWP), the unified stochastic particle method (USP), the nonlinear coupled constitutive relation method (NCCR), the 13/26-moment equations method (G13/26), and many more. These approaches serve distinct and essential roles in nearly all fields of fluid dynamics research.

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