Special Issue

Advances in Non-equilibrium Fluid Mechanics: Theory, Analysis, and Simulations

Message from the Guest Editors

The non-equilibrium of a flow is caused by physical and chemical processes occurring at different scales. The possibility of a detailed description of non-equilibrium fluid flows is of decisive importance, both for various engineering fields and for solving fundamental problems. The simulation of such flows is a multi-disciplinary problem encompassing molecular physics, chemistry, gas dynamics, thermodynamics and mathematics. The goal of this Special Issue is to publish original research and review articles covering the applications of various mathematical models and describing the development of numerical methods to simulate non-equilibrium fluid dynamic processes. Topics of interest include, but are not limited to, the following:

- Boltzmann and Model Kinetic Equations
- Direct Simulation Monte Carlo
- Mesoscale and Multiscale Modeling
- Micro- & Nanoscale Flows
- Multiphase Flows
- Non-equilibrium Reacting Flows
- Plasma Flows and Processes
- Supersonic Flows and Shock Waves
- Rarefied Gas Flows and Vacuum Technologies.

Guest Editors

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Deadline for manuscript submissions

closed (29 February 2024)

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About the Journal

Message from the Editor-in-Chief

The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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manuscripts are peer-reviewed and a first decision is provided to authors approximately 18.4 days after submission; acceptance to publication is undertaken in 2.4 days (median values for papers published in this journal in the first half of 2025).

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