



Stochastic Modeling in Fluid Dynamics

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Message from the Guest Editor

In recent years, stochastic modeling in fluid dynamics has witnessed significant progress. Weather forecast, ocean modeling, turbulence or gas dynamics are among the topics of application.

Probability has for a long time already played a role in modeling many physical phenomena, since uncertainty is always present in measurements and in every computational simulation. There are several ways to introduce randomness in a model: describing initial data by probability measures is one of them and corresponds to statistical approaches, while another consists in considering noise perturbations or random forces in the equations. Since fluid dynamics is described by partial differential equations, this leads to stochastic partial differential equations.

One can also interpret deterministic models such as the celebrated Navier–Stokes equation using stochastic formulations, revealing a more intrinsic probability nature of fluid dynamics. Numerical schemes for stochastic equations have also been largely developed recently.

The Special Issue will be devoted to contributions to stochastic models in fluid dynamical models, either theoretical or numerical.





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