Stochastic partial differential equations: analysis and computations

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An Editorial

As the name suggests, Stochastic Partial Differential Equations is an interdisciplinary area at the crossroads of stochastic processes and partial differential equations (SPDEs). The beginnings of SPDEs as a new discipline can be traced to the late sixties and early seventies of the previous century. It is safe to say that in the last four decades SPDEs have been one of the most dynamic areas of probability theory and stochastic processes.

Generally speaking, any partial differential equation is an SPDE if its coefficients, forcing terms, initial and boundary conditions, or some of the above are random/uncertain. Needless to say, this constitutes an extremely diverse area. The accelerating progress in research on stochastic partial differential equations has stimulated involvement of many experts from other fields in the research on stochastic PDEs.

As of now, the subject of SPDEs with its numerous important applications is an exciting mosaic of interconnected topics revolving around stochastics and partial differential equations. Interacting particle systems, fluid dynamics, statistical physics, financial modeling, nonlinear filtering, super-processes, continuum physics and, recently, uncertainty quantification are important contributors to and heavy users of the theory and practice of SPDEs.

In the last two decades numerical methods and large scale computations have become a very important and popular part of SPDEs. In fact, this development has made the applied side of SPDEs truly relevant to a wide range of high-tech areas, e.g. computer-based prediction and design, risk assessment and decision making in financial markets, energy, environment etc.

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Until recently, the subject of stochastic PDEs did not have a dedicated periodical. Papers on SPDEs were published in a large variety of journals on Probability, PDEs, Stochastic Process, Applied Mathematics, Numerical Analysis, and Control Theory. The new journal will promote synergistic interactions of theoretical and computational aspects of SPDEs and its numerous applications.

The Journal is governed by the editorial board consisting of the most outstanding and visible experts in the field. Our task, as the editors, is to make the Journal an important and dynamic forum for publications on the theory, numerical methods, and applications SPDEs. It will be highly selective and dedicated to publishing only the highest quality papers.

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Editors