

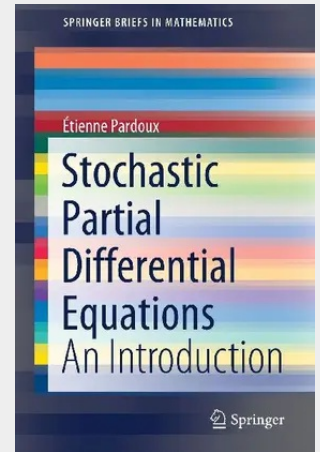
# Stochastic Partial Differential Equations

## An Introduction

This book gives a concise introduction to the classical theory of stochastic partial differential equations (SPDEs). It begins by describing the classes of equations which are studied later in the book, together with a list of motivating examples of SPDEs which are used in physics, population dynamics, neurophysiology, finance and signal processing. The central part of the book studies SPDEs as infinite-dimensional SDEs, based on the variational approach to PDEs. This extends both the classical Itô formulation and the martingale problem approach due to Stroock and Varadhan. The final chapter considers the solution of a space-time white noise-driven SPDE as a real-valued function of time and (one-dimensional) space. The results of J. Walsh's St Flour notes on the existence, uniqueness and Hölder regularity of the solution are presented. In addition, conditions are given under which the solution remains nonnegative, and the Malliavin calculus is applied. Lastly, reflected SPDEs and their connection with super Brownian motion are considered.

At a time when new sophisticated branches of the subject are being developed, this book will be a welcome reference on classical SPDEs for newcomers to the theory.

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