MR2571742 (2011c:60201) 60H15 (60H10 60H40)
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★Stochastic partial differential equations.
A modeling, white noise functional approach.
Second edition.
Universitext.

From the preface: “Since the first edition of this book appeared [Birkhäuser Boston, Boston, MA, 1996; MR1408433 (98f:60124)], white noise theory and its applications have expanded to several areas. Important examples are:


(iii) White noise theory for Lévy processes and Lévy random fields, with applications to SPDEs.

“The last area (iii) fits well into the scope of this book, and it is natural to include an account of this interesting development in this second edition. See the new Chapter 5. Moreover, we have added a remarkable new result of A. Lanconelli and Proske [Infin. Dimens. Anal. Quantum Probab. Relat. Top. 7 (2004), no. 3, 437–447; MR2085642 (2005h:60186)], who use white noise theory to obtain a striking general solution formula for stochastic differential equations. See the new Section 3.7. In the new Chapter 5 we provide an introduction to the more general theory of white noise based on Lévy processes and Lévy random fields, and we apply this theory to the study of SPDEs driven by this type of noise. This is an active area of current research.

“We show that the white noise machinery developed in the previous chapters is robust enough to be adapted, after some basic modifications, to the new type of noise. In particular, we obtain the corresponding Wick product, generalized Skorokhod integration and Hermite transform in the Lévy case, and we get the same general solution procedure for SPDEs. The method is illustrated by a study of the (stochastic) Poisson equation, the wave equation and the heat equation involving space or space-time Lévy white noise.

“In this second edition we also improve the presentation at some points and correct misprints.”

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