Título:

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Precio: $1299.35

Editorial:

Año: 2011

Tema:

Edición: 1ª

Sinopsis

ISBN: 9781420092110

Most existing books on evolution equations tend either to cover a particular class of equations in too much depth for beginners or focus on a very specific research direction. Thus, the field can be daunting for newcomers to the field who need access to preliminary material and behind-the-scenes detail. Taking an applications-oriented, conversational approach, Discovering Evolution Equations with Applications: Volume 2-Stochastic Equations provides an introductory understanding of stochastic evolution equations.

The text begins with hands-on introductions to the essentials of real and stochastic analysis. It then develops the theory for homogenous one-dimensional stochastic ordinary differential equations (ODEs) and extends the theory to systems of homogenous linear stochastic ODEs. The next several chapters focus on abstract homogenous linear, nonhomogenous linear, and semi-linear stochastic evolution equations. The author also addresses the case in which the forcing term is a functional before explaining Sobolev-type stochastic evolution equations. The last chapter discusses several topics of active research.

Each chapter starts with examples of various models. The author points out the similarities of the models, develops the theory involved, and then revisits the examples to reinforce the theoretical ideas in a concrete setting. He incorporates a substantial collection of questions and exercises throughout the text and provides two layers of hints for selected exercises at the end of each chapter.

Suitable for readers unfamiliar with analysis even at the undergraduate level, this book offers an engaging and accessible account of core theoretical results of stochastic evolution equations in a way that gradually builds readers' intuition.