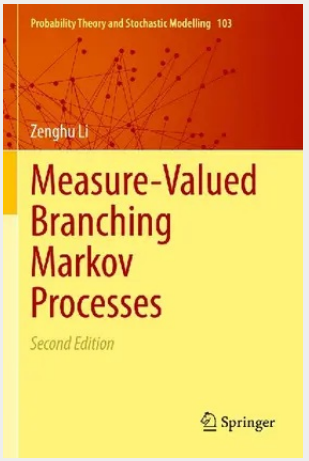
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Measure-Valued Branching Markov Processes



This book provides a compact introduction to the theory of measure-valued branching processes, immigration processes and Ornstein–Uhlenbeck type processes.

Measure-valued branching processes arise as high density limits of branching particle systems. The first part of the book gives an analytic construction of a special class of such processes, the Dawson–Watanabe superprocesses, which includes the finite-dimensional continuous-state branching process as an example. Under natural assumptions, it is shown that the superprocesses have Borel right realizations. Transformations are then used to derive the existence and regularity of several different forms of the superprocesses. This technique simplifies the constructions and gives useful new perspectives. Martingale problems of superprocesses are discussed under Feller type assumptions. The second part investigates immigration structures associated with the measure-valued branching processes. The structures are formulated by skewconvolution semigroups, which are characterized in terms of infinitely divisible probability entrance laws. A theory of stochastic equations for one-dimensional continuous-state branching processes with or without immigration is developed, which plays a key role in the construction of measure flows of those processes. The third part of the book studies a class of Ornstein-Uhlenbeck type processes in Hilbert spaces defined by generalized Mehler semigroups, which arise naturally in fluctuation limit theorems of the immigration superprocesses.

This volume is aimed at researchers in measure-valued processes, branching processes, stochastic analysis, biological and genetic models, and graduate students in probability theory and stochastic processes.

Preface to the Second Edition.- Preface to the First Edition.- Conventions and Notations.- 1. Random Measures on Metric Spaces.- 2. Measure-Valued Branching Processes.- 3. One-Dimensional Branching Processes.- 4. Branching Particle Systems.- 5. Basic Regularities of Superprocesses.- 6. Constructions by Transformations.- 7. Martingale Problems of Superprocesses.- 8. Entrance Laws and Kuznetsov Measures.- 9. Structures of Independent Immigration.- 10. One-Dimensional Stochastic Equations.- 11. Path-Valued Processes and Stochastic Flows.- 12. State-Dependent Immigration Structures.- 13. Generalized Ornstein-Uhlenbeck Processes.- 14. Small-Branching Fluctuation Limits.- A. Markov Processes.- References.- Subject Index.- Symbol Index.

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