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Titolo	Jump SDEs and the Study of Their Densities : A Self-Study Book / / by Arturo Kohatsu-Higa, Atsushi Takeuchi
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ISBN	9789813297418 9813297417
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Descrizione fisica	1 online resource (XIX, 355 p. 6 illus.)
Collana	Universitext, , 0172-5939
Disciplina	572.8293
Soggetti	Probabilities Functional analysis Differential equations, Partial Probability Theory and Stochastic Processes Functional Analysis Partial Differential Equations
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Review of some basic concepts of probability theory -- Simple Poisson process and its corresponding SDEs -- Compound Poisson process and its associated stochastic calculus -- Construction of Lévy processes and their corresponding SDEs: The finite variation case -- Construction of Lévy processes and their corresponding SDEs: The infinite variation case -- Multi-dimensional Lévy processes and their densities -- Flows associated with stochastic differential equations with jumps -- Overview -- Techniques to study the density -- Basic ideas for integration by parts formulas -- Sensitivity formulas -- Integration by parts: Norris method -- A non-linear example: The Boltzmann equation -- Further hints for the exercises .
Sommario/riassunto	The present book deals with a streamlined presentation of Lévy processes and their densities. It is directed at advanced undergraduates who have already completed a basic probability course. Poisson random variables, exponential random variables, and the introduction of Poisson processes are presented first, followed by the introduction of Poisson random measures in a simple case. With these tools the reader

proceeds gradually to compound Poisson processes, finite variation Lévy processes and finally one-dimensional stable cases. This step-by-step progression guides the reader into the construction and study of the properties of general Lévy processes with no Brownian component. In particular, in each case the corresponding Poisson random measure, the corresponding stochastic integral, and the corresponding stochastic differential equations (SDEs) are provided. The second part of the book introduces the tools of the integration by parts formula for jump processes in basic settings and first gradually provides the integration by parts formula in finite-dimensional spaces and gives a formula in infinite dimensions. These are then applied to stochastic differential equations in order to determine the existence and some properties of their densities. As examples, instances of the calculations of the Greeks in financial models with jumps are shown. The final chapter is devoted to the Boltzmann equation.