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Nota di contenuto	Intro -- Contents -- Part I: An Introduction to Levy and Feller Processes -- Preface -- Symbols and Notation -- Chapter 1: Orientation -- Chapter 2: Levy Processes -- Chapter 3: Examples -- Chapter 4: On the Markov Property -- Chapter 5: A Digression: Semigroups -- Chapter 6: The Generator of a Levy Process -- Chapter 7: Construction of Levy Processes -- Chapter 8: Two Special Levy Processes -- Chapter 9: Random Measures -- Chapter 10: A Digression: Stochastic Integrals -- Chapter 11: From Levy to Feller Processes -- Chapter 12: Symbols and Semimartingales -- Chapter 13: Denouement -- Appendix: Some Classical Results -- The Cauchy-Abel functional equation -- Characteristic functions and moments -- Vague and weak convergence of measures -- Convergence in distribution -- The predictable -algebra -- The structure of translation invariant operators -- Bibliography -- Part II: Invariance and Comparison Principles for Parabolic Stochastic Partial Differential Equations -- Preface -- Chapter 14: White Noise -- 14.1 Some heuristics -- 14.2 LCA groups -- 14.3 White noise on G -- 14.4 Space-time white noise -- 14.5 The Walsh stochastic integral -- 14.5.1 Simple random fields -- 14.5.2 Elementary random fields -- 14.5.3 Walsh-integrable random fields --

14.6 Moment inequalities -- 14.7 Examples of Walsh-integrable random fields -- 14.7.1 Integral kernels -- 14.7.2 Stochastic convolutions -- 14.7.3 Relation to Ito integrals -- Chapter 15: Levy Processes -- 15.1 Introduction -- 15.1.1 Levy processes on R -- 15.1.2 Levy processes on T -- 15.1.3 Levy processes on Z -- 15.1.4 Levy processes on Z/nZ -- 15.2 The semigroup -- 15.3 The Kolmogorov-Fokker-Planck equation -- 15.3.1 Levy processes on R -- Chapter 16: SPDEs -- 16.1 A heat equation -- 16.2 A parabolic SPDE -- 16.2.1 Levy processes on R -- 16.2.2 Levy processes on a denumerable LCA group. 16.2.3 Proof of Theorem 16.2.2 -- 16.3 Examples -- 16.3.1 The trivial group -- 16.3.2 The cyclic group on two elements -- 16.3.3 The integer group -- 16.3.4 The additive reals -- 16.3.5 Higher dimensions -- Chapter 17: An Invariance Principle for Parabolic SPDEs -- 17.1 A central limit theorem -- 17.2 A local central limit theorem -- 17.3 Particle systems -- Chapter 18: Comparison Theorems -- 18.1 Positivity -- 18.2 The Cox-Fleischmann-Greven inequality -- 18.3 Slepian's inequality -- Chapter 19: A Dash of Color -- 19.1 Reproducing kernel Hilbert spaces -- 19.2 Colored noise -- 19.2.1 Example: white noise -- 19.2.2 Example: Hilbert-Schmidt covariance -- 19.2.3 Example: spatially-homogeneous covariance -- 19.2.4 Example: tensor-product covariance -- 19.3 Linear SPDEs with colored-noise forcing -- Bibliography -- Index.

Sommario/riassunto

This volume presents the lecture notes from two courses given by Davar Khoshnevisan and René Schilling, respectively, at the second Barcelona Summer School on Stochastic Analysis. René Schilling’s notes are an expanded version of his course on Lévy and Lévy-type processes, the purpose of which is two-fold: on the one hand, the course presents in detail selected properties of the Lévy processes, mainly as Markov processes, and their different constructions, eventually leading to the celebrated Lévy-Itô decomposition. On the other, it identifies the infinitesimal generator of the Lévy process as a pseudo-differential operator whose symbol is the characteristic exponent of the process, making it possible to study the properties of Feller processes as space inhomogeneous processes that locally behave like Lévy processes. The presentation is self-contained, and includes dedicated chapters that review Markov processes, operator semigroups, random measures, etc. In turn, Davar Khoshnevisan’s course investigates selected problems in the field of stochastic partial differential equations of parabolic type. More precisely, the main objective is to establish an Invariance Principle for those equations in a rather general setting, and to deduce, as an application, comparison-type results. The framework in which these problems are addressed goes beyond the classical setting, in the sense that the driving noise is assumed to be a multiplicative space-time white noise on a group, and the underlying elliptic operator corresponds to a generator of a Lévy process on that group. This implies that stochastic integration with respect to the above noise, as well as the existence and uniqueness of a solution for the corresponding equation, become relevant in their own right. These aspects are also developed and supplemented by a wealth of illustrative examples.