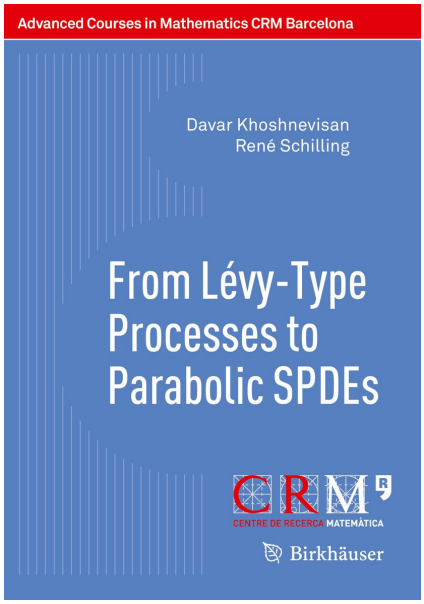

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From Lévy-Type Processes to Parabolic SPDEs

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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.