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   Autore   Bakry Dominique

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   Nota di contenuto   Introduction -- Part I Markov semigroups, basics and examples: 1. Markov semigroups -- 2.Model examples -- 3.General setting -- Part II Three model functional inequalities: 4.Poincaré inequalities -- 5. Logarithmic Sobolev inequalities -- 6.Sobolev inequalities -- Part III Related functional, isoperimetric and transportation inequalities: 7. Generalized functional inequalities -- 8.Capacity and isoperimetry-type inequalities -- 9.Optimal transportation and functional inequalities -- Part IV Appendices: A.Semigroups of bounded operators on a Banach space -- B.Elements of stochastic calculus -- C.Some basic notions in differential and Riemannian geometry -- Notations and list of symbols -- Bibliography -- Index.

Sommario/riassunto

The present volume is an extensive monograph on the analytic and geometric aspects of Markov diffusion operators. It focuses on the geometric curvature properties of the underlying structure in order to study convergence to equilibrium, spectral bounds, functional inequalities such as Poincaré, Sobolev or logarithmic Sobolev inequalities, and various bounds on solutions of evolution equations. At the same time, it covers a large class of evolution and partial differential equations. The book is intended to serve as an introduction to the subject and to be accessible for beginning and advanced scientists and non-specialists. Simultaneously, it covers a wide range of results and techniques from the early developments in the mid-eighties to the latest achievements. As such, students and researchers interested in the modern aspects of Markov diffusion operators and semigroups and their connections to analytic functional inequalities, probabilistic convergence to equilibrium and geometric curvature will find it especially useful. Selected chapters can also be used for advanced courses on the topic.