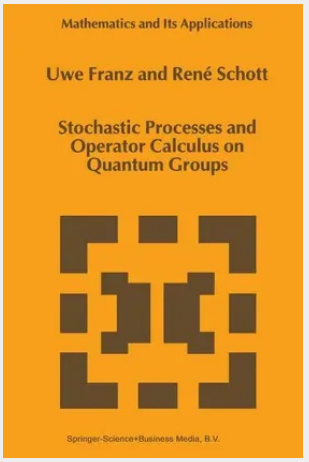
Franz / Schott

Stochastic Processes and Operator Calculus on Quantum Groups



Quantum groups have been investigated rather deeply in mathematical physics over the last decade. Among the most prominent contributions in this area let us mention the works of V.G. Drinfeld, S.L. Woronowicz, S. Majid. Prob ability the ory on quantum groups has developed in several directions (see works of P. Biane, RL. Hudson and K.R Partasarathy, P.A. Meyer, M. Schürmann, D. Voiculescu). The aim of this book is to present several new aspects related to quantum groups: operator calculus, dual representations, stochastic processes and diffusions, Appell polynomials and systems in connection with evolution equations. Much of the ma terial is scattered throughout available literature, however, we have nowhere found in accessible form all of this material collected. The presentation of representation theory in connection with Appell systems is original with the authors. Stochastic processes (example: Brownian motion, diffusion processes, Levy processes) are in vestigated and several examples are presented. As a text the work is intended to be accessible to graduate students and researchers not specialised in quantum prob ability. We would like to acknowledge our colleagues P. Feinsilver, R Lenzceswki, D.

1 Introduction.- 2 Preliminaries on Lie groups.- 3 Hopf algebras, quantum groups and braided spaces.- 4 Stochastic processes on quantum groups.- 5 Markov structure of quantum Lévy processes.- 6 Diffusions on braided spaces.- 7 Evolution equations and Lévy processes on quantum groups.- 8 Gauss laws in the sense of Bernstein on quantum groups.- 9 Phase retrieval for probability distributions on quantum groups and braided groups.- 10 Limit theorems on quantum groups.

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