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Nota di contenuto

Potential Theory in Classical Probability -- to Random Walks on Noncommutative Spaces -- Interactions between Quantum Probability and Operator Space Theory -- Dirichlet Forms on Noncommutative Spaces -- Applications of Quantum Stochastic Processes in Quantum Optics -- Quantum Walks.

Sommario/riassunto

This volume contains the revised and completed notes of lectures given at the school "Quantum Potential Theory: Structure and Applications to Physics," held at the Alfred-Krupp-Wissenschaftskolleg in Greifswald from February 26 to March 10, 2007. Quantum potential theory studies noncommutative (or quantum) analogs of classical potential theory. These lectures provide an introduction to this theory, concentrating on probabilistic potential theory and its quantum analogs, i.e. quantum Markov processes and semigroups, quantum random walks, Dirichlet forms on C^* and von Neumann algebras, and boundary theory. Applications to quantum physics, in particular the filtering problem in quantum optics, are also presented.
