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Multiquantum systems and point processes. I: Generating functionals and nonlinear semigroups. (English) [Zbl 0731.60110](#)

Rep. Math. Phys. 28, No. 1, 57-90 (1989).

Summary: An algebraic approach to representation theory and the description of multicomponent quantum systems is considered. A generating multiquantum state functional and nonlinear completely positive map are introduced and a dilation theorem giving a nonlinear extension of GNS and Stinespring theorem is proved. A number particle operator-valued weight and an empirical weight operator generating a macroscopic inductive algebra are defined, and asymptotic commutativity of this algebra is proved. A canonical multiquantum stochastic process called quasi-Poissonian is constructed and the general structure of the generator for infinite divisible multi-quantum states as well as multiquantum semigroups is found. An existence theorem extending the Lindblad theorem to unbounded generators as well as nonlinear generators is proved. The class of quasi-free quantum point stochastic processes is introduced to describe Markovian dynamics of non-interacting quantum particles and corresponding birth, branching and current nonlinear semigroups and their generators are studied.

MSC:

[60K40](#) Other physical applications of random processes

[81R05](#) Finite-dimensional groups and algebras motivated by physics and their representations

[81R10](#) Infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody, W -algebras and other current algebras and their representations

[60J99](#) Markov processes

Cited in 4 Documents

Keywords:

[multicomponent quantum systems](#); [dilation theorem](#); [asymptotic commutativity](#); [quasi-free quantum point stochastic processes](#)

Full Text: [DOI](#)

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