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Quantum probability based information processing on growing graphs. Preliminary report.

Growing graphs that dynamically change their vertices and edges are useful models to investigate information processing in networks such as cellular and social. We use quantum probabilistic approach to develop algorithms to process information and characterize the asymptotic behavior of graphs as they increase in size. Specifically, we construct interacting Fock spaces and define quantum stochastic processes on them to describe their dynamic evolution. Systems of imprimitivity are a more fundamental characterization of dynamical systems when described by a group, from which infinitesimal forms in terms of differential equations (Schrodinger, Heisenberg, and Dirac etc.) and the canonical commutation relations can be derived. The concept of localization, where the position operator is properly defined in a manifold, and covariance in relativistic sense of systems can be completely characterized by systems of imprimitivity. In this context, we construct systems of imprimitivity that live on distance-regular graphs induced by Bose-Mesner algebras and discuss their characteristics. (Received August 22, 2017)