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Statistical and optimal behaviours of weak continuous quantum measurement using stochastic path integral formalism AREEYA CHANTASRI, University of Rochester, ANDREW JORDAN, University of Rochester, Chapman University — We study stochastic behaviour and optimal dynamics of quantum systems under weak continuous measurement. Using the stochastic path integral formalism and action principle introduced in [Phys. Rev. A 88, 042110 (2013) and Phys. Rev. A 92, 032125 (2015)], the optimal evolution, such as the most likely paths, can be obtained by extremizing the action of the stochastic path integral. We also show that any statistical information, such as multi-time correlation functions for quantum state variables, can be derived by applying functional methods and a perturbative approach to the stochastic path integral. Examples are given in one-qubit and two-qubit case. Moreover, we consider an example of qubit measurement with feedback control, using the action principle to investigate the global dynamics of its most likely paths, and finding that qubit state stabilization at any desired pure state is possible with linear feedback.

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