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Equation of motion for estimation fidelity of monitored oscillating qubits

Bassa H
Konrad T
Diósi L
Uys H

ABSTRACT:

We study the convergence properties of state estimates of an oscillating qubit being monitored by a sequence of discrete, unsharp measurements. Our method derives a differential equation determining the evolution of the estimation fidelity from a single incremental step. If the oscillation frequency is precisely known, the estimation fidelity converges exponentially fast to unity. For imprecise knowledge of we derive the asymptotic estimation fidelity.