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Linear feedback stabilization for a continuously monitored qubit¹ TAYLOR PATTI, Chapman University, Institute for Quantum Studies, AREEYA CHANTASRI, University of Rochester, Center for Coherence and Quantum Optics, JUSTIN DRESSEL, Chapman University, Institute for Quantum Studies, AN-DREW JORDAN, University of Rochester, Center for Coherence and Quantum Optics, Institute for Quantum Studies — We explore continuous measurement-based quantum state stabilization through linear feedback control for a single quantum bit. We consider a continuous measurement of the σ_z observable of the qubit. By applying a time-varying Rabi drive that includes a linear feedback term, we show that the fixed points of the continuous measurement may be relocated. Numerical simulations are used to characterize the stability of the set of possible fixed points, as well as their modified collapse time-scales. We include the effects of realistic experimental non-idealities, such as environmental energy relaxation, dephasing, time-delay, and inefficient measurement.

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