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Hybrid phase-Fock-space approach to evolution of a driven nonlinear resonator MOSTAFA KHEZRI, ALEXANDER N. KOROTKOV, University of California, Riverside — We analyze the quantum evolution of a weakly nonlinear damped resonator driven by a classical pump, as in circuit QED measurement of a superconducting qubit. The resonator nonlinearity is induced by coupling with a qubit and produces a shearing effect that squeezes the state of the resonator field, either increasing or decreasing the qubit measurement fidelity. Using a hybrid phase-Fock-space representation for the resonator field within the Gaussian-state approximation, we derive evolution equations for the five parameters of a Gaussian state. Numerical solution of these five equations is much simpler than simulation of the density matrix evolution for the field, while providing good accuracy for the numerical analysis of squeezing.

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