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Adaptive feedforward control of superconducting resonators on RFSoC

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RFSoC has a number of advantages to reduce the costs associated with designing and debugging control algorithms for large and small research institutes: an adjustable PLL and multiple ADC/DACs capable of mixing frequencies and tuning the Nyquist operating zone and bandwidth, support for DSP algorithm developers and design tool vendors. Accelerated prototyping of the control system on RFSoC has given our institute the opportunity to develop a number of application-specific control algorithms: fully digital PLL, self-excitation loop, Tesla resonator simulator. The latest addition is an adaptive feedforward controller, previously developed and now being tested at the Hobicat test facility. This controller is characterized by its adaptability to external microphonic low-frequency excitations, which is important for systems with high quality factor, thus reducing the cost of maintaining system life.

Summary

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