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Updates to the Xopt ecosystem for advanced optimization and online control

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The Xopt ecosystem offers a versatile suite of tools designed to address the growing needs of advanced optimization and online control in scientific applications. These tools include Xopt, which implements a number of advanced, machine learning based control algorithms, and Badger, which provides a GUI for use in accelerator control rooms. The goal of these tools is to standardize the implementation and use of advanced optimization algorithms at arbitrary scientific facilities for the benefit of the wider accelerator community. These packages have been used at a number of accelerator facilities, including LCLS, LCLS-II, FACET-II, NSLS-II, RHIC, APS, ESRF, EU-xFEL, and others. In this work, we provide a summary of updates to Xopt and Badger that enable new capabilities and improve ease of use. This includes new developments in trust-region approaches to Bayesian optimization, GUI-based online visualization of surrogate models, and improvements to the frontend GUI for improved user experience.

Footnotes

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