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Updates to the Xopt/Badger Ecosystem for Advanced Optimization and Online Control

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The Xopt/Badger ecosystem offers a versatile suite of tools designed to address the growing needs of advanced optimization and online control in scientific applications. 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. 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 and GUI-based online visualization of surrogate models. Finally, we discuss the implementation of generator standards established between Xopt, libensemble, and optimus packages to allow for future interoperability, enabling robust usage of advanced optimization algorithms in both experiment and at high performance computing clusters.

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