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MULTIFIDELITY UQ WORKFLOWS WITH DAKOTA'S GRAPHICAL USER INTERFACE

Gianluca Geraci[1], Elliott M. Ridgway[1], Brian M. Adams[1], Bryan W. Reuter[1] and Michael S. Eldred[1]

[1] Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185.
{ggeraci,emridgw,briadam,bwreute,mseldre}@sandia.gov

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The Dakota software package [1] is a widely used collection of tools for optimization, sensitivity analysis, uncertainty quantification, and model calibration on black box codes. Among several recent algorithmic developments, multifidelity uncertainty quantification (MF UQ) strategies have emerged as effective tools able to decrease the computational requirements of UQ for high-fidelity computational models. Several MF UQ estimators are available in Dakota, including Multilevel Monte Carlo (MLMC), Multifidelity Monte Carlo (MFMC) and Approximate Control Variate (ACV). Moreover, in the last few years, Dakota's usability has been greatly enhanced by the introduction of a Graphical User Interface (GUI) [2]. The GUI aids with interfacing Dakota to a simulation, selecting, configuring, and running appropriate Dakota studies, and visualizing/interpreting the results.

In this contribution, we will extend the GUI to support MF UQ analysis workflows, which require interfaces to one or more simulation models, and guide users to the best MF UQ strategy after a pilot analysis phase. We will demonstrate Dakota GUI usage for MF UQ workflows under various analysis scenarios.

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[2] Dakota GUI Version 6.15 User Manual. Sandia National Laboratories, Albuquerque, NM, Updated November 2021. Available online from http://dakota.sandia.gov/documentation.html.