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Uncertainty Quantification for Combined Polynomial Chaos Kriging Surrogate Models JUSTIN WEINMEISTER, XINFENG GAO, ADITI KRISHNA PRASAD, SOURAJEET ROY, Colorado State Univ — Surrogate modeling techniques are currently used to perform uncertainty quantification on computational fluid dynamics (CFD) models for their ability to identify the most impactful parameters on CFD simulations and help reduce computational cost in engineering design process. The accuracy of these surrogate models depends on a number of factors, such as the training data created from the CFD simulations, the target functions, the surrogate model framework, and so on. Recently, we have combined polynomial chaos expansions (PCE) and Kriging to produce a more accurate surrogate model, polynomial chaos Kriging (PCK). In this talk, we analyze the error convergence rate for the Kriging, PCE, and PCK model on a convection-diffusion-reaction problem, and validate the statistical measures and performance of the PCK method for its application to practical CFD simulations.

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