1077-65-1465 **Hans-Werner van Wyk***, hvanwyk@vt.edu. *The Statistical Estimation of Uncertain Parameters in Elliptic PDEs.*

Recent successes in the use of stochastic Galerkin methods and collocation-based approaches to solving partial differential equations with random coefficients at a lower cost than traditional Monte Carlo methods have led to questions relating to their use in associated inverse problems. We consider the problem of statistically estimating the random diffusion coefficient of a second order elliptic PDE, given the statistical description of the model output. Besides addressing the questions of existence of minimizers and necessary optimality conditions, we formulate the associated inverse problem within a large-scale deterministic setting. In order to mitigate the curse of dimensionality, we propose a two-step parallelizable numerical method in which a global basis for the parameter space is statistically estimated, leading to a significantly simpler inverse problem to solve. (Received September 19, 2011)