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Richard K Archibald* (archibaldrk@ornl.gov), Oak Ridge National Laboratory, One Bethel Valley Road, P.O. Box 2008, MS-6301, Oak Ridge, TN 37831-6367. *Scalable adaptive function approximation and error estimation for stochastic simulations.*

Stochastic collocation methods are an attractive choice to characterize uncertainty because of their non-intrusive nature. High dimensional stochastic spaces can be approximated well for smooth functions with sparse grids. There has been a focus in extending this approach to non-smooth functions using adaptive sparse grids. We have developed a fast method that can capture piecewise smooth functions in high dimensions with high order and low computational cost. This method can be used for both approximation and error estimation of stochastic simulations where the computations can either be guided or come from a legacy database. We compare these methods to more traditional statistical approaches. (Received September 26, 2012)