COMPARISON STUDY OF PC AND KRIGING BASED SURROGATE MODELING

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ABSTRACT

Surrogate models are cheap-to-run models and developed as a standard tool to assist in complex design problems at various stages in an engineering domain. These numerical models provide a comparable level of accuracy and have been increasingly investigated in the past for various design purposes. Recently, a combination of Polynomial Chaos Expansions (PCE) and Kriging has been proposed in the literature, which replaces the underlying problem with a family of orthogonal polynomials and a realization of a Gaussian process, respectively. In this paper, we investigate the properties and performance of the latter approach in order to combine the accuracy and efficiency of PCE in performing variability analysis with the Kriging modeling power. The studied approach is compared with state-of-the-art techniques for the variability analysis over an engineering example.

Keywords: Surrogate model, Polynomial Chaos, Kriging, Polynomial Chaos Expansion