

Benchmarking Adaptive Multivariate Surrogate Modeling Techniques

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Abstract

The increasing computational complexity of computer simulation codes and the need for high fidelity simulation of large scale systems, has caused cheap meta-models to become standard practice in engineering design. Due to their compact representation and efficient implementation, these surrogate models allow fast exploration of the design space and extensive *what-if analysis*. In this contribution we compare three multivariate surrogate modeling techniques: *rational functions*, *multi-layer perceptrons* and *support vector machines*. Both predefined functions and real world engineering problems are used to check the performance of the meta-models. The results reveal the strengths and weaknesses of the different meta-model types and demonstrate the importance of adaptive meta-modeling and sequential design.