

Recent developments in metamodel based robust black-box simulation optimization: an overview

ABSTRACT

In the real world of engineering problems, in order to reduce optimization costs in physical processes, running simulation experiments in the format of computer codes have been conducted. It is desired to improve the validity of simulation-optimization results by attending the source of variability in the model's output(s). Uncertainty can increase complexity and computational costs in Designing and Analyzing of Computer Experiments (DACE). In this state-of-the-art review paper, a systematic qualitative and quantitative review is implemented among Metamodel Based Robust Simulation Optimization (MBRSO) for black-box and expensive simulation models under uncertainty. This context is focused on the management of uncertainty, particularly based on the Taguchi worldview on robust design and robust optimization methods in the class of dual response methodology when simulation optimization can be handled by surrogates. At the end, while both trends and gaps in the research field are highlighted, some suggestions for future research are directed.

Keyword: Simulation optimization; Robust design; Metamodel; Polynomial regression; Kriging; Computer experiments