Structural Optimization Under Stochastic Uncertainty

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Abstract

Structural optimization typically requires the multiple solution of large structural (static and dynamic) problems. This is in itself a fairly challenging task concerning computational resources. In the presence of random uncertainties, however, the computational effort is substantially increased. This is due to the fact that many methods for stochstic analysis are based on variants of Monte Carlo sampling. This is especially true if severly non-linear effects have to be considered in which case faster approximate probabilistic methods may not be sufficiently accurate. In order to partially alleviate this problem, application of response surface techniques (or meta-models) has become quite popular. The presentation will address the potentials and pitfalls of response surface methods in the context of stochastic structural optimization. Several selected examples aim at highlighting the source of problems and providing indicators on how to resolve these issues.

References

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