Adaptive Response Surface Approximation Method for Bayesian Inference

- ADMOS 2015 -

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ABSTRACT

The need for surrogate models and adaptive methods can be best appreciated if one is interested in parameter estimation using a Bayesian calibration procedure for validation purposes [1,2]. We extend our work on error decomposition and adaptive refinement for response surfaces [3] to the development of a surrogate model that can be utilized to estimate the parameters of Reynolds-averaged Navier-Stokes models. The error estimates and adaptive schemes are driven here by a quantity of interest and are thus based on the approximation of an adjoint problem. The desired tolerance in the error of the posterior distribution allows one to establish a threshold for the accuracy of the surrogate model. Particular focus is paid to accurate estimation of evidences to facilitate model selection.

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