



Certified metamodels for sensitivity indices estimation

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Global sensitivity analysis of a numerical code, more specifically estimation of Sobol indices associated with input variables, generally requires a large number of model runs. When those demand too much computation time, it is necessary to use a reduced model (metamodel) to perform sensitivity analysis, whose outputs are numerically close to the ones of the original model, while being much faster to run. In this case, estimated indices are subject to two kinds of errors: sampling error, caused by the computation of the integrals appearing in the definition of the Sobol indices by a Monte-Carlo method, and metamodel error, caused by the replacement of the original model by the metamodel. In cases where we have certified bounds for the metamodel error, we propose a method to quantify both types of error, and we compute confidence intervals for first-order Sobol indices.

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