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Robustness analysis in uncertainty quantification via perturbed law-based sensitivity indices

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When dealing with uncertainty quantification (UQ) in numerical simulation models, one of the most critical hypotheses is the choice of the probability distributions of the uncertain input variables which are propagated through the model. Bringing stringent justifications to these choices, especially in a safety study, requires quantifying the impact of potential uncertainty on the input variable distribution. To solve this problem, the robustness analysis method based on the "Perturbed Law-based sensitivity Indices"(PLI) can be used [1]. The PLI quantifies the impact of a perturbation of an input distribution on the quantity of interest (e.g. a quantile the model output). One of its interest is that it can be computed using a unique Monte-Carlo sample containing the model inputs and outputs. In this communication, we present new results and recent insights about the mathematical formalism and numerical validation tests of the PLI [2,3].
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Keywords

Computer experiments, Density perturbation, Sensitivity analysis

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