



# Asymptotic normality of a Sobol index estimator in Gaussian process regression framework

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Stochastic simulators such as Monte-Carlo estimators are widely used in science and engineering to study physical systems through their probabilistic representation. Global sensitivity analysis aims to identify the input parameters which have the most important impact on the output. A popular tool to perform global sensitivity analysis is the variance-based method which comes from the Hoeffding-Sobol decomposition. Nevertheless, this method requires an important number of simulations and is often unfeasible under reasonable time constraint. Therefore, an approximation of the input/output relation of the code is built with a Gaussian process regression model. This paper provides conditions which ensure the asymptotic normality of a Sobol's index estimator evaluated through this surrogate model. This result allows for building asymptotic confidence intervals for the considered Sobol index estimator. The presented method is successfully applied on an academic example on the heat equation.

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