Contribution ID: **10** Type: **not specified**

Sensitivity analysis for sets: Application to pollutant concentration maps

We are motivated by the field of air quality control, where one goal is to quantify the impact of uncertain inputs such as meteorological conditions and traffic parameters on pollutant dispersion maps. Sensitivity analysis is one answer, but the majority of sensitivity analysis methods are designed to deal with scalar or vector outputs and are badly suited to an output space of maps. To address this problem, we propose a generic approach to sensitivity analysis of set-valued models. This approach can be applied to the case of maps. We propose and study three different types of sensitivity indices. The first ones are inspired by Sobol' indices but adapted to sets based on the theory of random sets. The second ones adapt universal indices defined for a general metric output space. The last set of indices uses kernel-based sensitivity indices adapted to sets. The proposed methods are implemented and tested to perform an uncertainty analysis for a toy excursion set problem and for time-averaged concentration maps of pollutants in an urban environment.

Special/ Invited session

Sensitivity Analysis

Classification

Both methodology and application

Keywords

kernel-based sensitivity indices, random sets, HSIC

Primary author: Dr FELLMANN, Noé

Co-authors: Dr SPAGNOL, Adrien; HELBERT, Celine (Centrale Lyon - ICJ); Dr BLANCHET, Christophette; Dr SINOQUET, Delphine; Dr PASQUIER, Mathis

Presenter: HELBERT, Celine (Centrale Lyon - ICJ)

Track Classification: Other/special session/invited session