



QMC Opening Workshop August 28-September 1, 2017

Lecture: *Introduction to Global Sensitivity*

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Abstract:

Many mathematical models use a large number of poorly-known parameters as inputs. Quantifying the influence of each of these parameters is one of the aims of sensitivity analysis. Global Sensitivity Analysis is an important paradigm for understanding model behavior, characterizing uncertainty, improving model calibration, etc. Inputs' uncertainty is modeled by a probability distribution. There exist various measures built in that paradigm. This tutorial focuses on the so-called Sobol' indices, based on functional variance analysis. Estimation procedures will be presented, and the choice of the designs of experiments these procedures are based on will be discussed. As Sobol' indices have no clear interpretation in the presence of statistical dependences between inputs, it also seems promising to measure sensitivity with Shapley effects, based on the notion of Shapley value, which is a solution concept in cooperative game theory.