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Title:  New results for the functional ANOVA and Sobol’ indices

Abstract:  
Given a deterministic, black box, function on $[0,1]^d$, the Sobol’ indices are a commonly used way to decide which input variables or subsets of input variables are important. Sobol’ indices are sums of variance components from the ANOVA decomposition of the unit cube, known to statisticians through the work of Hoeffding (1948) as well as Efron and Stein (1981). Sobol’ indices and some generalizations have been derived and used in various ad hoc ways over the past two decades. This talk looks at a systematic exploration of what can be computed via Sobol’s methods. The framework recovers some old estimators of Saltelli (2002) and Mauntz (2002) as well as some new more efficient alternative estimators. Some connections to statistical experimental design are given.