Technische Universität Braunschweig

Vortrag im Gästeprogramm des GRK 2075

Dr. Anna Kucerova
CVUT Prag

Global sensitivity-based robust experiment design

Dienstag, 02.02.2016, 10.00 Uhr
Institut für Wissenschaftliches Rechnen, Raum 812
Mühlenpfordtstrasse 23, 38106 Braunschweig

Laboratory experiments are still mostly designed by trial and error method using the expert knowledge of the material model to be calibrated. This is, however, a difficult task in the case of advanced models developed to simulate engineering problems by non-linear finite element techniques. Existing methods for the model-based design of optimal experiments suffer from the high computational demands and lack of robustness of the underlying optimisation process, which makes their application to non-linear finite element (FE) simulations difficult. In this contribution we present a novel method introducing polynomial chaos-based surrogates of FE model. Such surrogates bring two principal advantages. First, they allow to overcome the computational burden of many times repeated FE simulations within the process of experiment design optimisation. Second, they allow fast analytical evaluation of Sobol's indices or response variances, which can be used for quantification of global sensitivity of measured quantities to identified parameters. The advantages and drawbacks of the proposed method are demonstrated on 2D experiment designed for identification of the volumetric thermal capacity and the conductivities in the two principal directions. The goal of the given experiment design is to find optimal positions of three sensors.

Kontakt
Institut für Statik
Technische Universität Braunschweig
Beethovenstraße 51
38106 Braunschweig
0531 - 391-3668
grk-2075@tu-bs.de
www.tu-braunschweig.de/grk-2075