Lothar-Collatz-Kolloquium für Angewandte Mathematik

Donnerstag, den 18. Juni 2014, um 17:15 Uhr, im Hörsaal 5

Prof. Dr. Jochen Garcke*  
(Universität Bonn, Institut für Numerische Simulation)

**Big data analytics for repositories of numerical simulations**

Zusammenfassung/Abstract:

Numerical simulations are used intensively in the developing process of new industrial products or in the natural sciences and have achieved a high degree of detail. In that workflow often hundred or thousand simulations, e.g. representing different product configurations, are simulated within a few days or even overnight. Currently the decision process for finding the optimal product parameters can involve the comparative evaluation of large finite element simulation bundles by post-processing each one of those results for example using 3D visualisation software. This time consuming process creates a severe bottleneck in the product design or scientific workflow.

To handle these data we investigate a big data framework. We concentrate on using machine learning techniques to assist in the virtual product development process. In particular nonlinear dimensionality reduction approaches help to find a low dimensional parameterisation of the dataset. In such a reduced representation, similar variants are organised in clusters and the influence of the input variables can be analysed along such a parameterisation, speeding up and simplifying the analysis process of engineers or scientists. We demonstrate the application of this approach to a realistic and relevant industrial example for robustness analysis of the bumper location in a frontal crash simulation.

Kontakt:
Prof. Dr. Armin Iske  
Optimierung und Approximation  
Raum 138, Tel.: 040 42838-5264  
E-Mail: armin.iske@uni-hamburg.de  
Web: http://www.math.uni-hamburg.de/home/iske/

* Prof. Dr. Jochen Garcke  
Universität Bonn, Institut für Numerische Simulation,  
Wegelerstr. 6, 53115 Bonn  
E-Mail: garcke.ins.uni-bonn.de  
Web: http://garcke.ins.uni-bonn.de/

Die aktuelle Version der Kolloquiumsankündigungen (inkl. Abstracts) finden Sie unter:
http://www.math.uni-hamburg.de/spag/angmath/kolloq/

Stand: 08.06.2015 (Katrin Kopp)