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Einladung

Im Rahmen des Schwerpunktskolloquiums „Analysis und Numerik“ hält

Herr Professor Dr. Jean-Frédéric Gerbeau
(Inria Paris & Laboratoire J.L. Lions (UPMC & CNRS))

am **Donnerstag , dem 15. Februar 2018**, einen Vortrag zum Thema:

Numerical Methods for Variability Modeling and Biomarkers Design

Der Vortrag findet um **17:00 Uhr** in Raum **H 305** statt.

Alle Interessenten sind herzlich eingeladen.

Andrea Barjasic
Beauftragte für das Kolloquium

Abstract:

Many phenomena are modeled by deterministic differential equations, whereas the observation of these phenomena, in particular in life science, exhibit an important inter-subject variability. We will address the following question: how the model can be adapted to reflect the variability observed in a population? We will present a non-parametric and non-intrusive procedure based on offline computations of the deterministic model. The algorithm infers the probability density function of uncertain parameters from the matching of the observable statistical moments at different points in the physical domain. This inverse procedure is improved by incorporating a point selection algorithm that both reduces its computational cost and increases its robustness. The method will be illustrated for different models, based on Ordinary or Partial Differential Equations. In particular, applications to experimental data sets in cardiac electrophysiology will be presented. In biophysics and medicine, the system of interest is often studied by monitoring quantities, called biomarkers, extracted from measurements. These biomarkers convey some information about relevant hidden quantities, which can be seen as parameters of an underlying model. We propose a strategy to automatically design biomarkers to estimate a given parameter. Such biomarkers are chosen as the solution of a sparse optimization problem. We will show applications in electrophysiology where our algorithm provides composite biomarkers which improve the parameter estimation and the classification problems.