Sonderforschungsbereich 1060

The Mathematics of Emergent Effects

Einladung zu einem Vortrag im SFB-Seminar

Prof. Dr. Sebastian Reich

Universität Potsdam

spricht zum Thema

Assimilation of data into scientific models: An optimal transportation perspective

Zeit: Dienstag, den 20. Januar 2015, 14.15 Uhr

Ort: Lipschitz-Saal 1.016, Endenicher Allee 60

Kaffee/Tee: anschl. im Plücker-Saal 1.015

gez. **Michael Griebel**

Abstract: Reliable forecasting requires the combination of scientific modeling with available data. When dynamical phenomena are to be forecasted, this requirement leads to sequential data assimilation problems which are best tackled from a Bayesian perspective.

Bayes' formula provides the centerpiece for Bayesian data assimilation and Bayesian learning in general. However, beyond its conceptional simplicity and beauty, Bayes' formula is hardly ever directly applicable and this is true in particular when Bayes' formula needs to be interfaced with complex scientific models. In this context it is better to talk of simulating Bayes' formula. Bayes' formula can be simulated in the setting of sequential Monte Carlo methods and general Markov chain Monte Carlo methods. However, those methods suffer from the curse of dimensionality.

In my talk, I will start approaching Bayes' formula from an entirely different perspective; namely that of coupling probability measures and optimal transportation. This approach (i) naturally puts the popular ensemble Kalman filters into context and suggests natural extensions to non-Gaussian data assimilation problems, (ii) allows for the implementation of sequential Monte Carlo methods in high dimensions using the concept of localisation, and (iii) can be combined with quasi-Monte Carlo sampling approaches.