COMPUTATIONAL MATHEMATICS SEMINAR

TUESDAY   14   MAY   2019 - ROOM: MA A1 10   at   4.15 pm

Dr Martin EIGEL

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will present a seminar entitled:

« A statistical learning approach for parametric PDEs »

Abstract:

Parametric PDEs (as encountered in the popular field of Uncertainty Quantification) are computationally complex due to the high dimensionality of the models describing random data. Common numerical approaches are Monte Carlo methods for statistical quantities of interest and functional approximations, representing the entire solution manifold in some function space. Assuming sufficient regularity (or sparsity), the latter attain high theoretical convergence rates. In practice, this can be realised e.g. by employing some kind of (a posteriori) error control. However, the implementation usually is non-trivial and does not generalise easily.

We examine a non-intrusive Variational Monte Carlo (VMC) method based on statistical learning theory. This provides a combination of deterministic and statistical convergence results. The Galerkin solution can be computed with high probability by using a tensor recovery algorithm on a training set of generated solution realisations. Similarly, a residual a posteriori error estimator can be reconstructed easily, steering all discretisation parameters.

Lausanne, April 24, 2019
FN/rb