Institute of Mathematical Research
Department of Mathematics

COLLOQUIUM

Fast UQ for diffusion and neutron transport

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Abstract

We shall describe some practical uncertainty quantification problems involving the diffusion equation and the Boltzmann transport equation where the uncertainty is described by stationary Gaussian random fields. Small length scale and high variance presents PDEs problems with a challenging multiscale structure. We describe a UQ algorithm for these applications which combines circulant embedding techniques for the sampling with Quasi Monte-Carlo methods for computing the required high-dimensional integrals. The method is capable of handling very high stochastic dimension and is consistently faster than Monte-Carlo methods. Multilevel variants can be used to obtain further acceleration. We describe some recent theory and computations.

This is joint work with F. Kuo and I.H. Sloan (UNSW), D. Nuyens (Leuven) and M. Parkinson and R. Scheichl (Bath).

Date:	July 28, 2017 (Friday)
Time:	3:00 – 4:00pm
Venue:	Room 210, Run Run Shaw Bldg., HKU

All are welcome