Warwick Centre for Predictive Modelling Seminar Series

Probabilistic Numerical Methods for Deterministic Differential Equations

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Thursday, 18th Jun, 4 p.m.
R0.12, Ramphal Building, Ground Floor

Abstract: Numerical solutions of differential equations contain inherent uncertainties due to the finite dimensional approximation of a function. In modelling scenarios where the quantification of uncertainty is a key goal it is therefore important to study the uncertainty introduced by the numerical method, in order to determine its importance relative to other uncertainties, such as those caused by noisy data or by model error. This work is concerned with a probabilistic methodology for doing so. We demonstrate an approach which gives rise to root mean square convergence rates which are consistent with the underlying deterministic method. Furthermore, we employ the method of modified equations to demonstrate enhanced rates of convergence to stochastic or random perturbations of the original deterministic problem. Ordinary differential equations and elliptic partial differential equations are used to illustrate the approach.

This is joint work with Patrick Conrad, Mark Girolami (both Warwick, Statistics), Simo Sarkka (Aalto BECS) and Konstantinos Zygalakis (Southampton, Mathematics).

More info: http://www2.warwick.ac.uk/fac/sci/wcpm/seminars