

Prof. Fabio NOBILE

Mathematics Institute of Computational Science and Engineering - MATHICSE

SEMINAR OF NUMERICAL ANALYSIS

➤ **MONDAY 11 APRIL 2016 - ROOM ME D0 1418 - 11h15**

Dr. Tao ZHOU (Chinese Academy of Sciences, Beijing, China) will present a seminar entitled:

“A generalized sampling and preconditioning scheme for sparse approximation of polynomial chaos expansions”

Abstract:

We propose an algorithm for recovering sparse orthogonal polynomials using stochastic collocation. Our approach is motivated by the desire to use generalized polynomial chaos expansions to quantify uncertainty in models subject to uncertain input parameters. The standard sampling approach for recovering sparse polynomials is to use Monte Carlo (MC) sampling of the density of orthogonality. While we propose a general algorithm that can be applied to any admissible weight function on a bounded domain and a wide class of exponential weight functions defined on unbounded domains. Our proposed algorithm samples with respect to the weighted equilibrium measure of the parametric domain, and subsequently solves a preconditioned l^1 -minimization problem, where the weights of the diagonal preconditioning matrix are given by evaluations of the Christoffel function. We present theoretical analysis to motivate the algorithm, and numerical results that show our method is superior to standard Monte Carlo methods in many situations of interest.

Lausanne, 3 March 2016/FN/cr