Seminar on Modern Scientific Computing Trends

We invite all those interesting in modern scientific computing trends to a free 1-hour seminar.

February 26, 2015 · 12:00–13:30 · Building 101, Meeting Room 2.

Proper Generalized Decomposition Method: algorithms and applications to several stochastic PDEs

In this talk, I will present various applications of the Proper Generalized Decompositon (PGD) Method for the approximate solution of Partial Differential Equations involving random (uncertain) parameters, that is SPDEs. The PGD consists in a series of functionals with separated deterministic and stochastic components. The series is sought to minimize the approximation error in a prescribed sense (often the equation resiudal). Starting from the simple case of SPES having energy functionals, e.g. elliptic equations, I will review and compare several algorithms for the approximation of the ideal decomposition. I will subsequently show that these algorithms can be successfully applied to several (moderately) non-linear problems, in particular the incompressible Navier-Stokes equations. Alternative separation formats, needed to further reduce the computational complexity of the PGD algorithms, will also be discussed. Finally, I will present recent PGD results for the uncertain wave equation which requires a multi-resolution framework to effectively deal with the complicated structure of the stochastic functionals.

Program

12:00 – 12:10	Coffee and tea.
12:10 – 12:15	Welcome and introduction by Assoc. Prof. Allan P. Engsig-Karup, DTU Compute.
12:15 – 13:00	*Proper Generalized Decomposition Method: algorithms and applications to several stochastic PDEs*
	By Directeur de Recherche CNRS Olivier Le Matre, Laboratoire d'Informatique pour la Mécanique et les Sciences de l'Ingénieur LIMSI-CNRS, France.
13:00 – 13:30	Refreshments and networking

Registration. Please register as soon as possible due to limited seats by sending an e-mail to Assoc. Prof. Allan P. Engsig-Karup (apek@dtu.dk) or Ph.D. Daniele Bigoni (dabi@dtu.dk), Section for Scientific Computing, Department of Applied Mathematics and Computer Science (DTU Compute), DTU.