数学与系统科学研究院

计算数学所学术报告

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报告题目：

Reduced basis methods and several extensions for uncertainty quantification

邀请人：　　周涛 博士

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报告地点：　科技综合楼三层 **311**

计算数学所报告厅

Abstract:

Uncertainty quantification (UQ) deals with characterization, propagation, reduction of various uncertainties in mathematical modelling, simulation and optimization of a physical or engineering system. Some common computational challenges have been identified in solving UQ problems, including "curse of dimensionality" for high dimensional stochastic problems and "Gibbs phenomenon" for problems with low regularity in stochastic space. Many numerical methods have been developed to tackle these challenges, such as stochastic Galerkin methods and stochastic collocation methods with sparse structures and hp adaptive algorithms. Based on reduced basis methods, we have developed several efficient model order reduction techniques to alleviate the computational effort and guarantee the numerical accuracy as well. In this talk, I will cover the basic ideas and formulations of reduced basis methods, their comparison with stochastic collocation methods and several extensions on weighted schemes, hybrid algorithms, goal-oriented adaptive approaches, etc. Some applications of the reduced basis methods will also be mentioned, for instance reliability/sensitivity analysis and stochastic optimal control problems. This is a joint work with Prof. Alfio Quarteroni and Dr. Gianluigi Rozza.

欢迎大家参加！