

数学与系统科学研究院

计算数学所学术报告

报告人: **Dr. Zhiwen Zhang**

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报告题目:

**A Dynamically Bi-Orthogonal
Method for Time-Dependent
Stochastic Partial Differential
Equation**

邀请人: 陈志明 研究员

报告时间: **2014 年 6 月 17 日 (周二)**

上午 10:00-11:00

报告地点: **数学院南楼二层 202**

会议室

Abstract:

We propose a dynamically bi-orthogonal method (DyBO) to study time dependent stochastic partial differential equations (SPDEs). The objective of our method is to exploit some intrinsic sparse structure in the stochastic solution by constructing the sparsest representation of the stochastic solution via a bi-orthogonal basis. It is well-known that the Karhunen-Loeve expansion minimizes the total mean squared error and gives the sparsest representation of stochastic solutions. However, the computation of the KL expansion could be quite expensive since we need to form a covariance matrix and solve a large-scale eigenvalue problem. In this talk, we derive an equivalent system that governs the evolution of the spatial and stochastic basis in the KL expansion. Unlike other reduced model methods, our method constructs the reduced basis on-the-fly without the need to form the covariance matrix or to compute its eigen-decomposition. We further present an adaptive strategy to dynamically remove or add modes, perform a detailed complexity analysis, and discuss various generalizations of this approach. Several numerical experiments will be provided to demonstrate the effectiveness of the DyBO method.

欢迎大家参加!