Abstracts

Georg Gottwald (University of Sydney)

Title: Stochastic parameterizations of deterministic dynamical systems: Theory, applications and challenges(Joint work with Jeroen Wouters)

Abstract: There is an increased interest in the stochastic parameterization of deterministic dynamical systems whereby a high-dimensional deterministic dynamical system is reduced to a low-dimensional stochastically driven system.

We discuss standard techniques of stochastic model reduction such as homogenization. Recently rigorous results have been obtained justifying this method. The theory relies on an asymptotic limit of infinite time scale separation which is not always satisfied in real world applications. We present a new method to go beyond this asymptotic limit by employing Edgeworth approximations.

Applications of the general framework of stochastic parameterization in numerical weather prediction and the climate sciences are discussed.

Wei Wang (Nanjing University)

Title: On approximation of stochastic wave equations with singular perturbation (Joint work with Yan Lv)

Abstract：In this talk, we review some results on approximation of stochastic wave equation with singular perturbation. Some most recent results are also presented.

Zhiwen Zhang （The University of Hong Kong）

Title: A model reduction method for stochastic multiscale elliptic PDEs using the operator compression approach

Abstract: We introduce a model reduction method for stochastic elliptic PDEs with multiscale coefficients, which gives optimal approximation property of the solution operator. This method consists of two stages and suits the multi-query setting. In the offline stage, we construct local stochastic basis functions that give optimal approximation property of the solution operator. The basis functions are energy minimizing functions on local regions of the domain. In the online stage, using our local stochastic basis functions, we can efficiently solve the stochastic

elliptic multiscale PDEs with relatively small computational costs. Numerical results are presented to demonstrate the efficiency of the proposed method.


Xiaopeng Chen (Shantou University)

Title: Stochastic center manifolds without gap condition

Abstract：The existence of invariant manifolds requires that the spectrum of linear part of a deterministic system or stochastic system contains large gaps. However, for some dynamical systems, the condition of spectral gap condition is not satisfied. In this case, it is still unknown whether there exists invariant manifolds. The paper concerns stochastic center manifolds for the stochastic systems without a gap condition. We present some stochastic systems which have the stochastic center manifolds, but have not a gap condition.

楚文化

楚文化是中华民族文化的重要组成部分，它源远流长，博大精深，具有鲜明的地域特色和巨大的经济文化开发价值。楚地是一个历史的地域概念，大体上以今湖北全境和湖南北部为中心，向周边扩展到一定的范围。当北方有炎、黄部落在创造中原文明的时候，南方江汉流域也兴起了九黎部落，并创造出了大溪文化、屈家岭文化等早期楚地文化。
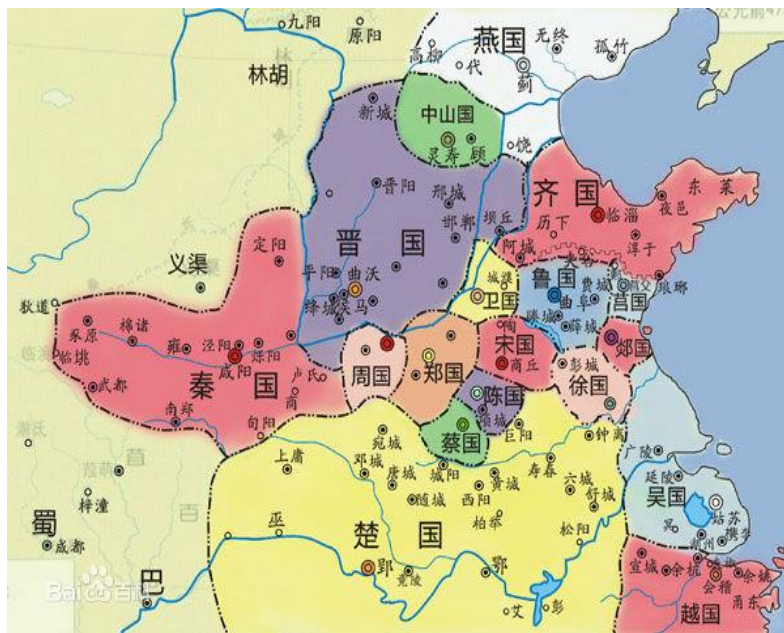
湖北是楚文化的发祥地，楚国作为春秋战国时期的大国和强国之一，在800多年的历史长河中创造了灿烂辉煌的文明成果。楚国独步一时的青铜铸造工艺、领袖群伦的丝织刺绣工艺、巧夺天工的漆器制造工艺、义理精深的哲学、汪洋恣肆的散文、惊采绝艳的辞赋、五音繁会的音乐、翘袖折腰的舞蹈、恢诡谲怪的美术，都是十分宝贵的文化富矿。

楚文化的主要构成可概括为六大支柱:青铜冶铸、丝织刺绣、木竹漆器、美术音乐、老庄哲学、屈骚文学。

以下简单介绍一些具有代表性的楚国历史文化。

曾侯乙墓是战国时期曾侯乙的一座墓葬，位于湖北随州城西两公里的擂鼓墩东团坡上。侯乙墓呈"卜"字形，墓坑开凿于红砾岩中，为多边形岩坑竖穴木椁墓。无墓道，南北向，墓坑南北长16.5米，东西宽21米，深13米，面积为220平方米。

墓中随葬以九鼎八簋（guǐ，音轨）和编钟、编磬为主的礼乐器，遵守了周代诸侯的身份，九鼎八簋应为天子使用，诸侯应使用七鼎六簋，反映出先秦社会严格的礼乐制度在后期已经出现裂缝，以及人们对天地、神明和祖先的敬畏。十二律俱全的64件青铜双音编钟（不包括楚王所送镈钟）、玲珑剔透的尊盘和完整地书写二十八宿（xiù，音秀）名称的衣箱等，体现了先秦时期中国在艺术、技术、天文等方面的极高成就。其中出土的曾侯乙编钟是迄今发现的最完整最大的一套青铜编钟。

曾侯乙墓出土的以编钟为代表的万件文物，以在文化艺术和科学技术上的辉煌成就而震惊世界，作为墓主人的曾侯乙也因而备受世人关注，然而曾侯乙史籍无载。

郭沫若主编的《中国史稿》指出周朝在随国、曾国都封有同姓诸侯。1979年，在随州市郊义地岗季氏梁一座春秋中期的墓葬出土两件铭文铜戈，器主季怡为曾国公族，曾穆侯之子西宫的后人。根据铭文，季怡自称"周王孙"，证明曾侯本是周王的宗支。

Chu culture

Chu culture is an important part of the Chinese culture. It has a long history, extensive and profound, with distinctive local characteristics and is of great economic and cultural value. Chu is a historical geographical concept, largely across today's Hubei and Hunan provinces as the center (`Central China' or Huazhong).

Hubei province, with Wuhan as the capital, is the birthplace of Chu culture. As one of the great powers of the spring and autumn period (770 BC – 476 BC) and the warring states period (476 BC – 221 BC), Chu created a glorious civilization, in the long history of more than 800 years.

The main components of Chu culture can be summarized into six pillars: bronze metallurgy, silk embroidery, wood and bamboo lacquer ware, art music, Lao-Tze's philosophy, and QuSao literature.

Some representatives of Chu culture history:

Chu totem:

Chu music：Zenghou Yi tomb (about 2430 year ago) is located in Suizhou, west of Hubei province. Unearthed with the tom are thousands pieces of valuable items, including the chimes (Musical Instruments; see piture) and astronomical maps.
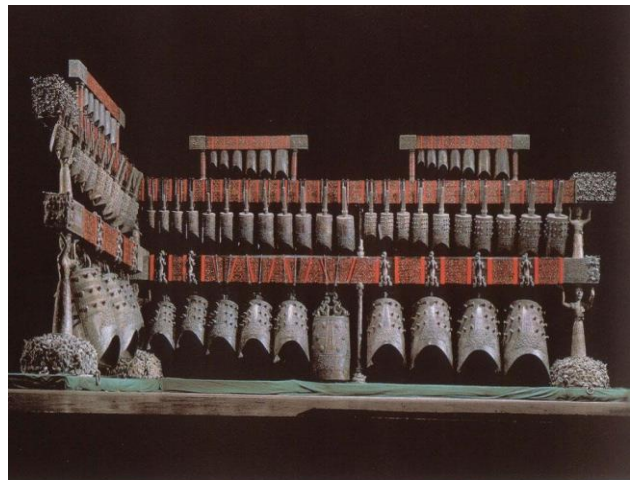
Chu lacquer:

Chu Cloth:

Chu bronze:

Chu literature:

屈原

深思高舉潔白清忠
汨羅江上萬古悲風

华中科技大学数学中心简介

　　在建设世界一流大学的征程中，数学学科的作用异常重要。华中科技大学高瞻远瞩，于 2013 年成立数学中心。数学中心一方面倡导数学不同分支之间的相互交叉，激发新的合作研究，催生新的研究领域和研究群体。另一方面引领数学与工科、理科，医科及其它学科之间的合作研究，实现交叉创新、合作共赢。

　　华中科技大学数学中心积极开展前瞻性研究，立足华中、辐射全国、影响海外。数学中心将国际先进的人才培养模式和研究机构运行机制有机融入到我国建设一流大学与一流学科的伟大事业之中，　努力成为培养和聚集一流人才的平台，国际交流与合作的平台，科教运行机制以及人事体制改革试点的平台。

　　数学中心成员包括院士，千人计划专家，外专千人计划专家，长江学者，青年千人，楚天学者，洪堡学者和华中学者。还有一批海内外知名访问学者，博士后，博士生，以及来自多个国家的留学生。数学中心设有李国平讲座教授，东湖讲座教授，东湖数学论坛，和郭友中数理科学讲座。

　　希望重要的数学发现萌芽于此，
　　希望新的研究领域和研究群体产生于此，
　　希望著名数学家和科学家在此留下足迹，
　　希望科技界更深刻地感受到数学的作用：
　　数学强，则科技强；科技强，则国家强！