

Workshop on Advanced Mathematics

Department of Mathematics
Fudan University, Shanghai Jiao Tong University & National University of Singapore

23 & 24 Feb 2010, Seminar Room, S17 #06-11

Programme – Day 1

Day 1: Tuesday 23 Feb, Morning Session

9.15 Welcome Address
Prof Chong Chi Tat, Head, Department of Mathematics

9:30 - 10:00

Speaker: Prof Chen Shuxing, Fudan University
Title: Study of Multidimensional Conservation Laws: History and Progress

10.00 - 10.30

Speaker: A/Prof Zhang De-Qi, National University of Singapore
Title: Building blocks and dynamics of symmetries on compact complex manifolds

10.30 - 11.00

Tea Break (outside seminar room)

11.00 – 11.30

Speaker: Prof Wang Yaguang, Shanghai Jiao Tong University
Title: Boundary layers in viscous flow and interface in two-phase flow

Day 1: Tuesday 23 Feb, Afternoon Session

2.00 – 2.30

Speaker: Prof Shen Weixiao, National University of Singapore
Title: Measure and dimension in non-uniformly expanding one-dimensional dynamics

2.30 – 3.00

Speaker: A/Prof Tan Kai Meng, National University of Singapore
Title: Kleshchev's decomposition numbers of symmetric groups and related algebras

-----*End of Day 1*-----

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Programme – Day 2

Day 2: Wednesday 24 Feb, Morning Session

9:30 - 10:00

Speaker: Prof Wang Weike, Shanghai Jiao Tong University
Title: ~TBA~

10.00 - 10.30

Speaker: Dr Ji Hui, National University of Singapore
Title: Removing motion blur from images using sparse approximation

10.30 - 11.00

Tea Break (outside seminar room)

11.00 – 11.30

Speaker: Prof Wu Zongmin, Fudan University
Title: MQ-quasi interpolation and the numerical differentiation

Day 2: Wednesday 24 Feb, Afternoon Session

2.00 – 2.30

Speaker: Prof Tan Ser Peow, National University of Singapore
Title: Dynamics of the $\text{Out}(\pi)$ action on the $\text{SL}(2, \mathbb{C})$ character variety of π , the free group on two generators.

2.30 – 3.00

Speaker: Prof Wu Quanshui, Fudan University
Title: 4-dimensional AS-regular algebras and quantum \mathbb{P}^3 's

-----*End of Workshop*-----

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Abstracts of Talks

Prof Chen Shuxing
Fudan University

Title: Study of Multidimensional Conservation Laws: History and Progress

A/Prof Zhang De-Qi
National University of Singapore

Title: Building blocks and dynamics of symmetries on compact complex manifolds

Abstract: We show that automorphisms / endomorphisms on compact Kahler (or projective) manifolds are all canonically built up from those on three types of manifolds: Complex torus, Calabi-Yau manifold and Rationally connected variety. If time permits, we will also show the dynamical Tits alternative theorem to bound the rank of dynamically interesting symmetries.

Prof Wang Yaguang
Shanghai Jiao Tong University

Title: Boundary layers in viscous flow and interface in two-phase flow

Abstract: In this talk, we shall study the asymptotic behavior of boundary layers in small viscosity limit for a viscous flow with the Navier-friction boundary condition. Furthermore, the motion of an interface for a two-phase flow in a channel will be studied. By multi-scale analysis for the sharp interface limit, we derive a formula of the contact angle between the interface and the physical wall.

Prof Shen Weixiao
National University of Singapore

Title: Measure and dimension in non-uniformly expanding one-dimensional dynamics

Abstract: We discuss the fractal dimension of Julia sets of rational maps, as well as regularity of conformal measures and physical measures, under a weak non-uniformly expanding assumption.

A/Prof Tan Kai Meng
National University of Singapore

Title: Kleshchev's decomposition numbers of symmetric groups and related algebras

Abstract: Despite its rich structure, the symmetric group algebras in positive characteristic p are still not well-understood, and many problems --- some of which fundamental --- remain open. Among the most famous is the complete determination of its decomposition numbers.

In 1996, Kleshchev introduced sign sequences associated to partitions of integers, and used them to describe the decomposition numbers $d_{\{\lambda\}\mu}$, where the partition λ is obtained from μ by moving one node. In this talk, we present our results which extends this to decomposition numbers $d_{\{\lambda\}\mu}$, where the partition λ is obtained from μ by moving an arbitrary number of nodes, all of which having the same p -residue.

Prof Wang Weike
Shanghai Jiao Tong University

(TBA)

Dr Ji Hui
National University of Singapore

Title: Removing motion blur from images using sparse approximation

Abstract: As an ill-posed blind deconvolution problem, how to removing motion blur from images has been a well-known challenging problem in digital photography. Based on the sparsity priors of images and blur kernels under suitable redundant tight frame domains, we propose a new regularization approach to recover both blur kernels and clear images from motion-blurred images. The resulting minimization problem can be solved efficiently using Bregman iteration based approaches. Extensive experiments on real images showed that the proposed algorithm is very efficient to remove motion blur from nature images. It is a joint work with Jian-feng Cai (UCLA), Chaoqiang Liu and Zuwei Shen (NUS).

Prof Wu Zongmin
Fudan University

Title: MQ-quasi interpolation and the numerical differentiation

Prof Tan Ser Peow
National University of Singapore

Title: Dynamics of the $\text{Out}(\pi)$ action on the $\text{SL}(2, \mathbb{C})$ character variety of π , the free group on two generators.

Abstract: We investigate the dynamics of the $\text{Out}(\pi)$ action on the $\text{SL}(2, \mathbb{C})$ character variety of π , the free group on two generators. We will pose several questions, and give some partial results.

Prof Wu Quanshui
Fudan University

Title: 4 -dimensional AS-regular algebras and quantum P^3 's

Abstract: I will start from the definition of AS-regular algebras, and concentrate on the idea of classification of 4 -dimensional AS-regular algebras or quantum P^3 's by using A_{∞} -algebras.
