

國家理論科學研究中心數學組(臺北辦公室)

臺大數學科學中心

NCTS/TPE & TIMS Joint Activity in Probability

**演講者**：謝南瑞 教授

Prof. Narn-Rueih Shieh

臺灣大學數學系

National Taiwan University

**講題**：Overviews on Stochastic Analysis

**時間**：2009 年 9 月 18 日 (星期五) 10:30-12:00

**地點**：臺灣大學數學系新數學館 405 室

**摘要**：In this talk, we review the development and the essentials of stochastic analysis; with view toward the SA for exponential processes.

**主辦人**：謝南瑞 教授 (臺灣大學數學系)

相關事宜請與梁宜婷小姐聯絡 Tel:(02)3366-9927 歡迎上網查詢 網址：[http:// math.cts.ntu.edu.tw/](http://math.cts.ntu.edu.tw/)

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NCTS/TPE & TIMS Joint Activity in Probability

**演講者：** 李兵 博士

Dr. Bing Li

國家理論科學研究中心數學組(臺北辦公室) & 臺灣大學數學系

NCTS/TPE & National Taiwan University

**講題：** Probability in Symbolic Dynamics

**時間：** 2009年9月25日(星期五) 10:30-12:00

**地點：** 臺灣大學數學系新數學館 405 室

**摘要：** In this talk, we report some connections of probability theory and symbolic dynamical systems; with view toward the random continued fractions and the random covering problem.

**主辦人：** 謝南瑞 教授 (臺灣大學數學系)

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**演講者**：劉聚仁 先生

Mr. Gi-Jen Liu

臺灣大學數學系

National Taiwan University

**講題**：Passive Tracer Transport in  
Stochastic Flows

**時間**：2009 年 10 月 2 日 (星期五) 10:30-12:00

**地點**：臺灣大學數學系新數學館 405 室

**摘要**：In this talk, we report the passive transport problems in random environments; with view toward W.A. Woyczynski's LNM 1800 Chapter 7

**主辦人**：謝南瑞 教授 (臺灣大學數學系)

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NCTS/TPE & TIMS Joint Activity in Probability

**演講者** : 劉聚仁 先生 Mr. Gi-Jen Liu

臺灣大學數學系

National Taiwan University

**講題** : Passive Tracer Transport in Stochastic Flows II

**時間** : 2009 年 10 月 9 日 (星期五) 10:30-12:00

**地點** : 臺灣大學數學系新數學館 405 室

**摘要** : In this talk, we report the passive transport problems in random environments; with view toward W.A. Woyczynski's LNM 1800 Chapter 7

**主辦人** : 謝南瑞 教授 (臺灣大學數學系)

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## NCTS/TPE & TIMS Joint Activity in Probability

**演講者** : 孫嶸楓 教授 Prof. Sun, Rongfeng

新加坡國立大學 National University of Singapore

**講題** : Stochastic flows of kernels in the Brownian net and the Brownian web

**時間** : 2009年10月16日 (星期五) 10:30-12:00

**地點** : 臺灣大學數學系新數學館 405 室

**摘要** : Le Jan and Raimond developed a theory of stochastic flows of kernels, showing that each consistent family of  $n$ -point motions gives rise to a stochastic flow of kernel. As an example, they constructed a special family of such flows where the underlying one-point motion is a Brownian motion on  $\mathbb{R}$ . Recently, Howitt and Warren introduced a much more general class such flows on  $\mathbb{R}$ , where the underlying  $n$ -point motions are Brownian motions with sticky interactions upon collision. Stochastic flows of kernels can be interpreted as random motion in a stationary space-time random environment, where the environment satisfies certain independent innovation properties. Here we give a graphical construction of the underlying environment for the Howitt-Warren flow in terms of the Brownian net (resp. the Brownian web), which loosely speaking consists of a collection of branching-coalescing (resp. coalescing) Brownian motions starting from every point in the space-time plane. Almost sure path properties for the Howitt-Warren flow will also be derived. This is based on joint work in progress with Jan M. Swart (UTIA, Prague) and Emmanuel Schertzer (Columbia, New York).

**主辦人** : 謝南瑞 教授 (臺灣大學數學系)

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NCTS/TPE & TIMS Joint Activity in Probability

**演講者**： 陳怡全 教授 Prof. Yi-Chiuan Chen  
中央研究院數學所 Academia Sinica

**講題**： Markov Shift and Anti-integrable limit in  
Dynamical Systems

**時間**： 2009 年 10 月 30 日 (星期五) 10:30-12:00

**地點**： 臺灣大學數學系新數學館 405 室

**摘要**： An important way to understand the dynamics of maps is via the symbolic dynamics. In this talk, I shall show examples the embedded Markov shift of which can be obtained in a very natural manner at their anti-integrable limits.

**主辦人**： 謝南瑞 教授 (臺灣大學數學系)

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**演講者** : 蕭守仁 教授 Prof. Shoou-Ren Hsiau

國立彰化師範大學數學系

National Changhua University of Education

**講題** : Optimal stopping problems in discrete time processes

**時間** : 2009 年 11 月 6 日 (星期五) 10:30-12:00

**地點** : 臺灣大學數學系新數學館 405 室

**摘要** : In this talk I will review several optimal stopping problems in discrete time processes and introduce some tools used in this area. The classical problems such as secretary problem , parking problem and their extensions will be addressed. The theory of backward induction and the notion of monotone case will also be discussed.

**主辦人** : 謝南瑞 教授 (臺灣大學數學系)

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**演講者** : 陳冠宇 教授 Prof. Guan-Yu Chen

國立交通大學應用數學系

National Chiao Tung University

**講題** : On the mixing time for ergodic Markov chains

**時間** : 2009 年 11 月 13 日 (星期五) 10:30-12:00

**地點** : 臺灣大學數學系新數學館 405 室

**摘要** : Markov chains with  $n$  states are used in a great variety of situations to approximate, understand and sample from their limiting distributions. In the quantitative analysis of Markov chains, one is interested in the "mixing time" of the chain, that is, the time at which the chain gives a good approximation of its limiting distribution. A remarkable phenomenon known as the cutoff phenomenon reveals the observation that the distribution of the chain is a good approximation to the limiting distribution after the "cutoff time" but never gets well before. This idea was introduced by D. Aldous and P. Diaconis in 1980s to capture the fact that some ergodic Markov chains converge abruptly to their invariant distributions. Such a phenomenon is closely related to the mixing time behavior which can be sensitive to measurement mechanics on the convergence of Markov chains to their stationarity. This is believed to happen frequently so that it makes sense to talk about the "mixing time". In this talk, we consider families of ergodic Markov processes, which include classical examples such as families of ergodic  $n$  Markov chains and Brownian motions on families of compact Riemannian manifolds. Under the measurement of  $L_p$ -norm, we will give criteria on the examination of cutoff phenomena. When  $p = 2$ , formulas on the  $L_2$ -mixing time are available and will be illustrated with a couple of classical examples. 1

**主辦人** : 謝南瑞 教授 (臺灣大學數學系)

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**演講者** : 洪盟凱 教授 Prof. John M. Hong

中央大學數學系

National Central University

**講題** : Sub-to-super transonic steady states and their linear stabilities for gas flows.

**時間** : 2009 年 11 月 27 日 (星期五) 10:30-12:00

**地點** : 臺灣大學數學系新數學館 405 室

**摘要** : In this talk we consider the stability of sub-to-super transonic steady states of a one-dimensional model of isentropic compressible flows through a nozzle of varying area with or without viscosity. These sub-to-super transonic steady states are newly found by using the geometric singular perturbation theory. We show that the sub-to-super steady states are physically relevant in the sense that they are linear stable as long as their velocities are great than  $1/\sqrt{2}$  of the sound speed.

**主辦人** : 謝南瑞 教授 (臺灣大學數學系)

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**演講者**：曾文哲 教授 Prof. Wen-Jer Tseng  
淡江大學物理系 Tamkang University

**講題**：Genetic Switch in Periodically Changing Environments

**時間**：2009 年 12 月 25 日 (星期五) 10:30 -12:00

**地點**：臺灣大學數學系新數學館 405 室

**摘要**：because all the cell populations are capable of making switches between different genetic expression states in response to the environmental change, it is natural to ask the question: In a constantly fluctuating environment, which type of cell population (heterogeneous or homogeneous) is fitter in the long term? We take an extensive analysis about how the cell population evolves in a periodically switching environment either with symmetrical time-span or asymmetrical time-span. A complete picture of the phase diagrams for both cases is obtained. Furthermore, we also explain in detail how the fitness problem bears much resemblance to the phenomenon, stochastic resonance, in physical sciences.

**主持人**：謝南瑞 教授 (臺灣大學數學系)

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