

同餘的概念及應用

Congruence and its Applications

講者：數學系導師 劉智軒博士

Speaker: Dr. LAU Chi Hin,
Instructor, Department of Mathematics

摘要 ABSTRACT

設 n 是一個正整數，如果兩個對模 n 的差是 n 的倍數，我們稱這兩個對模 n 為「同餘」。中國古代數學其中一個最傑出的貢獻就是解決同餘方程組的可解性問題，這個重要結果就是有名的中國剩餘定理，這個定理及其推廣到今天仍是研究數論的重要工具。我們會介紹同餘的概念及其在日常生活中的一些應用。

Let n be a positive integer. Two integers are said to be congruent modulo n if their difference is a multiple of n . One of the greatest achievements of ancient Chinese mathematics is the Chinese Remainder Theorem, which is a result on the solvability of simultaneous congruence equations. To this day, the theorem and its generalizations are very important in the studies of number theory. We will discuss the concept of congruence and some of its applications in daily life.

講者簡介 Speaker's Biography

劉智軒博士在香港中文大學取得理學士、哲學碩士及教育學士學位，主要研究複幾何；現任教於香港中文大學數學系，並為國際數學奧林匹克香港委員會委員，多年來參與國際數學奧林匹克香港代表隊領隊及訓練工作。

Dr. LAU Chi Hin holds a B.Sc. and an M.Phil. degree from The Chinese University of Hong Kong and a Ph.D. degree in Mathematics from The University of Hong Kong. He was the leader of the International Mathematics Olympiad Hong Kong Team held in Mexico. He is currently an Instructor in the Department of Mathematics at The Chinese University of Hong Kong and a member of International Mathematics Olympiad Hong Kong Committee.

變型金剛不是夢

Several Clues about Making Transformers

講者：物理系副教授 王福俊教授

Speaker: Professor ONG Hock Chun Daniel,
Associate Professor, Department of Physics

摘要 ABSTRACT

材料科學是一門跨領域學科，綜合物理、化學、生物學以及工程學所發展而成。材料與人類發展息息相關，而且人類對各種物料的應用足以刻畫人類發展史裏的各個時代，比如石器時代、銅器時代及鐵器時代。材料科學於現代生活中常見的應用包括電子產品和納米科技等。材料科學的研究也獲數個諾貝爾化學獎或諾貝爾物理獎的肯定，包括獲頒發2010年諾貝爾物理獎的石墨烯研究。是次講座將透過幾個示範來探討製造變形金剛的奧秘。

Materials science is a multidisciplinary subject built on physics, chemistry, biology, and engineering. Materials have been of great importance to humans. The material of choice of a given era is often its defining point; the Stone Age, Bronze Age, and Iron Age are just a few examples. Recent examples of applications of materials science include electronics and nanotechnology. Several Nobel Prizes in Physics and Chemistry have been awarded to studies of materials science, including the 2010 Nobel Prize in Physics on graphene science. In this talk, several demonstrations will be given to explore the making of Transformers.

講者簡介 Speaker's Biography

王福俊教授於美國西北大學獲得學士及哲學博士學位。王教授現為香港中文大學物理系副教授。他的研究興趣以表面等離子體激元、金屬光子晶體及含光學特性材料為主。

Prof. ONG Hock Chun Daniel obtained both his B.A. and Ph.D. degrees from Northwestern University, USA. He is currently associate professor at the Department of Physics of the Chinese University of Hong Kong. His research interests are surface plasmon polaritons, metallic photonic crystals, and optical characterizations of materials.



第六屆 柳愛華紀念科學講座

The 6th
Lau Oi Wah Memorial Science Lecture Series

Date 日期: 02-04-2011
Time 時間: 09:30 - 13:00
Venue 地點: 香港中文大學邵逸夫堂
Sir Run Run Shaw Hall

理學院及柳愛華紀念基金主辦
Organised by the Faculty of Science &
The Lau Oi Wah Memorial Fund

<http://www.cuhk.edu.hk/sci/memorialtalk>

講座程序表 LECTURE SERIES SCHEDULE

時間 Time	節目 Programme	講者 Speaker
09:30 - 09:45	進場及登記 Registration	
09:45 - 10:00	開幕禮 Opening Ceremony	
10:00 - 10:40	生物硬碟：細菌生命的新意義 The Living Hard-disk: an Alternative Meaning to the Life of Bacteria	盧泉芳, 麥嘉欣, 嚴基元, 余志承 Jacky LOO, Cathy MAK, Allen YU, Aldrin YIM
10:40 - 11:20	舌脈透玄機 Secret of the Pulse of the Tongue	梁 晶博士 Dr. LIONG Ching
11:20 - 11:40	小休 Break	
11:40 - 12:20	同餘的概念及應用 Congruence and its Applications	劉智軒博士 Dr. LAU Chi Hin
12:20 - 13:00	變型金剛不是夢 Several Clues about Making Transformers	王福俊教授 Prof. Daniel ONG

生物硬碟：The Living Hard-disk:
an Alternative Meaning to the Life of Bacteria

細菌生命的新意義

講者：生命科學學院生物化學課程隊伍代表
盧芳泉、麥嘉欣
余志承、嚴基元

Speakers: LOO Fong Chuen Jacky,
MAK Ka Yan Cathy, YU Chi Shing Allen
and YIM Kay Yuen Aldrin
Team representatives from the Biochemistry Programme,
School of Life Sciences

摘要 ABSTRACT

假如所有生物活在世上都有其目的，細菌現在也有一個嶄新的任務——作為儲藏的硬碟，而科學家一直努力將之實現。為了將細菌儲藏的潛能發揮出來，我們引入平行數據儲藏系統，設計了一套能在生物系統編碼（A、T、G、C – 四種組成DNA的原始鹼基）和電腦語言中（二進制的1和0）互相翻譯的系統。再者，我們利用大量細菌作為海量數據之儲藏。為了提升數據保密的安全程度，我們將數據以特定方法拼湊，令其中的秘密只能由擁有加密鑰匙的人才能拆解。「細菌儲藏技術」似是科幻小說情節，但實驗已令它成真！

If every organism exists for a purpose and then bacteria has been given a new mission – to function as a hard disk. Many scientists have been working on this area. To unlock the potential of bacteria as data storage, we introduced a parallel data storage system. We designed a system to translate between the binary digits in the computing system and nucleotides A, T, G, and C in DNA. Moreover, we have used multiple cells to achieve a larger storage capacity. In order to secure the information stored, the bacteria can scramble the information in a manner so that only the people who possess the encryption key would know how to decode the information. Using bacteria to store information may seem like science fiction, but it is being realized in the laboratory.

講者簡介 Speaker's Biography

我們是中文大學首屆參加由美國麻省理工學院舉辦的2010年度國際基因機器設計大賽 (iGEM) 隊伍，由十名生命科學學院的學生組成，各有不同專業領域，如生物化學、食物營養科學等。此外，我們背後有一班指導導師默默支持及教導我們。講者嚴基元及余志承為中文大學生命科學學院研究生，是隊伍中不可或缺的指導者，負責指導電腦數據處理。講者盧芳泉為隊長，麥嘉恩為實驗工作的主要成員之一。

As the first-time participants representing the Chinese University of Hong Kong in the International Genetically Engineered Machine (iGEM) 2010 competition organized by the Massachusetts Institute of Technology (MIT) in the US, our team comprises of ten undergraduates majoring in Biochemistry. We also have three student instructors and faculty advisors guiding us throughout the project. The four speakers of today's talk are: Aldrin Yim and Allen Yu, who are the student instructors of the team responsible for the computational work of the project; and Jacky Loo and Cathy Mak, team leader and member, respectively, and are responsible for the experimental work of the project.

舌脈透玄機

Secret of the Pulse of the Tongue

講者：中醫學院導師 梁晶博士

Speaker: Dr. LIONG Ching,
Instructor, School of Chinese Medicine

摘要 ABSTRACT

中國醫學有三千多年的歷史，其診斷和治療疾病的方法既獨特而又讓人倍感神秘。一位中醫醫生是怎樣通過「把脈」知道病人身體狀況的？舌診的臨床意義又是什麼？中醫的診斷治療方法究竟有沒有科學的依據？是次講座即將與你從傳統和現代科學兩個不同的角度來討論中醫學。

Chinese medicine has over 3000 years of history. The methods used in diagnosis and treatment of diseases seem mysterious and different from modern medicine. How can a Chinese medicine doctor know the health condition of a patient by pulse sensation? What is the clinical meaning of tongue examination? Is there any scientific basis behind diagnosis and treatment? This lecture will discuss some areas of Chinese medicine from both the traditional and modern scientific views.

講者簡介 Speaker's Biography

梁晶博士在香港中文大學取得中醫學學士及中醫藥學哲學博士學位；現於香港中文大學中醫學院從事教學及科研，並於附屬教學診所參與臨床工作。

Dr. LIONG Ching holds a B.CMed. and a Ph.D. degree in Chinese Medicine from The Chinese University of Hong Kong. She is now actively pursuing teaching and research at the CUHK, and she also practices clinical work at the affiliated clinic.

理學院院長的話 Message from the Dean of Science



The Lau Oi-Wah Memorial Science Lecture Series was established in 2005, in recognition of Professor Lau Oi-Wah's contribution to Science Education at The Chinese University of Hong Kong (CUHK) and in Hong Kong in general.

Professor Lau obtained her B.Sc. degree in 1965 from the University of Hong Kong (HKU). She joined Chung Chi College of CUHK as an Assistant Lecturer in 1968, when she was still working on her Ph.D. thesis. After the completion of her doctoral degree in inorganic chemistry in 1970 at HKU, she became a Lecturer at CUHK. She was promoted to Senior Lecturer in 1982 and Reader in 1993. She was awarded a Leverhulme Foundation Fellowship in 1971 by Imperial College, London and an Honorary Research Fellowship in 1978 by the University of Birmingham. Professor Lau became a Chartered Chemist and an elected Fellow of the Royal Society of Chemistry, U.K., in 1981. She was elected to be the Dean of the Science Faculty for three successive terms, from 1994 to her retirement in 2003.

Professor Lau was a dedicated teacher and a caring research advisor. During her academic career, she supervised seven Ph.D. students and about 30 M.Phil. students. I am an alumnus of CUHK and was lucky to have Professor Lau as my teacher in analytical chemistry when I was an undergraduate in 1968. Our class was probably the first class that she taught at CUHK. Since Professor Lau was just a few years older than us, and because of her warm personality, we always viewed her as our older sister. Other than an outstanding chemist and teacher, Professor Lau was also an excellent ping-pong player and was an active participant in most student activities. Her energy, as manifested in her ping-pong game, was second to none.

Professor Lau was a devoted teacher who always put her students' learning and benefit first. During her Deanship, she had successfully pushed for the establishment of many interdisciplinary teaching and research programs. This remains a direction for the curricula developments of the Science Faculty. In addition to university teaching, she had also initiated an effort to promote science education in secondary schools. In order to recognize Professor Lau's contribution to science education in Hong Kong and to commemorate her commitment to education in general, her friends and students have established a memorial fund to support the Lau Oi-Wah Memorial Science Lecture Series, after the passing of Professor Lau. This Lecture Series began in 2005, so this is the sixth of the Series. Professor Lau's dedication, which continues to this day with this Lecture Series, has served Hong Kong high school students well, inspiring them to consider a career in science. As a former student of Professor Lau, I am honored to succeed her as Dean of Science. Returning to my alma mater to serve in this capacity, I feel that her dedicated spirit is always with us, helping us to succeed.



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