MATH-IMS Joint Applied Mathematics Colloquium Series
The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series is organized by Center for Mathematical Artificial Intelligence (CMAI), under Department of Mathematics and Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The colloquium series focuses on mathematics and applications of artificial intelligence, big data and related topics.

Date: Mar 19, 2021 (Friday)
Time: 14:00-15:00 (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/92775210812

The Yau-Yau Method for Nonlinear Filtering Problems

Speaker: Professor Shing-Tung Yau, Harvard and CUHK

Abstract: The nonlinear filtering problem has important applications in military, engineering, and commercial industries. The core issue of nonlinear filtering is to solve the Duncan–Mortensen–Zakai (DMZ) equation in real time and in a memoryless manner. In this talk, I will briefly introduce the filtering problem and the history of the DMZ equation, and present an efficient numerical algorithm of the Yau-Yau method for solving high-dimensional nonlinear filtering problems.

Bio: Professor Shing-Tung Yau is one of the most influential contemporary mathematicians. He is William Casper Graustein Professor of Mathematics at Harvard University and also serves as Distinguished Visiting Professor-at-Large and Director of The Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong (CUHK), paying visits to CUHK regularly. In 1969, he graduated from the Department of Mathematics, Chung Chi College, the Chinese University of Hong Kong, and was then admitted to the University of California, Berkeley where he completed his PhD two years later under the supervision of Prof. Chern Shiing-shen. He taught at the Institute for Advanced Study of Princeton, Stanford University, Stony Brook University, and University of California, San Diego. He has been a faculty member at Harvard since 1987. Professor Yau initiated the development of mathematics in China. He led a number of research institutes in China, including Hong Kong where he grew up, for research and nurturing young mathematicians. He strived for research in mathematics for 40 years. The impact of his research work can be seen in the mathematical and physical fields of differential geometry, partial differential equations, convex geometry, algebraic geometry, enumerative geometry, mirror symmetry, general relativity, and string theory, while his work has also touched upon applied mathematics, engineering, and numerical analysis. Because of his tremendous contributions in mathematical research, Professor Yau has received numerous awards and honors. At his age of 33, he was granted the Fields Medal, which was regarded as the Nobel Prize in Mathematics. He continued to be recognized via the Veblen Prize in Geometry (1981), the MacArthur Fellowship (1985), the Crafoord Prize (1994) and the US National Medal of Science (1997). In 2010, Professor Yau received the Wolf Prize in Mathematics in recognition of his lifetime contribution to geometric analysis, and his enormous impact on many areas of geometry and physics. In 2010, he has received the Asian American Engineer of the Year (AAEOY) to recognize his contributions in the applied mathematics and engineering field. In 2018, he was awarded the Marcel Grossmann Award.