



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: Sep 3, 2021 (Friday)

Time: 16:00-17:00 (Hong Kong Time)

Zoom Link: <https://cuhk.zoom.us/j/92775210812>

Deep Approximation via Deep Learning

*Speaker: Professor Zuowei Shen
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Abstract: The primary task of many applications is approximating/estimating a function through samples drawn from a probability distribution on the input space. The deep approximation is to approximate a function by compositions of many layers of simple functions, that can be viewed as a series of nested feature extractors. The key idea of deep learning network is to convert layers of compositions to layers of tunable parameters that can be adjusted through a learning process, so that it achieves a good approximation with respect to the input data. In this talk, we shall discuss mathematical theory behind this new approach and approximation rate of deep network; we will also discuss how this new approach differs from the classic approximation theory, and how this new theory can be used to understand and design deep learning network.

Bio: Prof. Shen Zuowei is the Vice Provost (Graduate Education & Special Duties) at the National University of Singapore (NUS). He received his PhD in 1991 from the University of Alberta, Canada and completed his postdoctoral training at University of Wisconsin-Madison. Prof. Shen joined NUS in 1993, became Distinguished Professor in 2009 and has been Tan Chin Tuan Centennial Professor since 2013. Prof. Shen is well-known for his fundamental contributions in mathematical foundations of data science, especially in the areas of approximation and wavelet theory, image processing and compressed sensing, computer vision and machine learning. His recent research interests focus on approximation theory of deep neural networks. Prof. Shen sits on several editorial boards of top journals and has been invited to many international conferences, including the ICM in 2010 and the ICIAM in 2015. He has received numerous awards and honors, including the NUS Outstanding University Researcher Award and the National Science Award of Singapore. Prof. Shen has been elected as Fellow of the World Academy of Sciences, Fellow of the Society for Industrial and Applied Mathematics, U.S., Fellow of the American Mathematical Society, U.S., and inaugural Fellow of the Singapore National Academy of Science.