

# Hong Kong - Singapore joint Seminar Series in Financial Mathematics/Engineering

## Deep Learning-based Closed-loop Optimal Control Design Professor Weinan E Peking University, China

### Abstract

Progress on designing closed loop optimal control has been hindered by the difficulties associated with the curse of dimensionality. In 2016, Jiequn Han and I developed the first deep learning-based algorithm for solving high dimensional control problems. This opened up a lot of new possibilities including solving high dimensional partial differential equations, high dimensional game theory problems, and of course, high dimensional control problems. In fact, solving high dimensional problems is now among the most active area in scientific computing.

However, it has not been an easy task to turn these kinds of algorithms to practical use. I will review the progress made so far as well as the difficulties in this area. I will discuss applications to the control of robotic arms, as well as to macro-economics.

The work presented is joint work with a lot of people, particularly Jiequn Han, Jihao Long and Yucheng Yang

### About the speaker

Prof. E is an Academician of Chinese Academy of Sciences, Professor of School of Mathematical Sciences at Peking University, Professor of School of Mathematical Sciences and Institute of Applied Mathematics of Princeton University of the United States, and joint director of the National Engineering Laboratory of Big Data Analysis and Applied Technology. Professor E is the recipient of the ACM Gordon-Bell Prize, the SIAM R. E. Kleinman Prize, SIAM von Karman Prize, the Peter Henrici Prize and the ICIAM Collatz Prize. He is a member of the Chinese Academy of Sciences, a fellow of the American Mathematical Society, a SIAM fellow and a fellow of the Institute of Physics. Prof. E was invited to give a one-hour plenary lecture at ICM 2022. He was also invited as a keynote speaker at ICML 2022. Prof. E's current work centers on machine learning.

### Date

20 Oct 2022(Thursday)  
(HK Time)

### Time

4:00pm – 5:00pm (HK  
Time)

### Zoom

<https://cityu.zoom.us/j/94565317300?pwd=VjZOWHFFNllveEgyQnpuSUhMS3F5QT09>

### Meeting ID:

945 6531 7300

### Passcode:

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