THE UNIVERSITY　　　　　　　　**OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

Optimization and Machine Learning Seminar

Rates for least squares using over-parameterized neural networks

Prof. Yunfei Yang
Sun Yat-sen University, China

Abstract

Recent studies showed that deep neural networks can achieve minimax optimal rates for learning smooth function classes. However, most of these results require that the neural networks in use are under-parameterized, which cannot explain the successes of over-parameterized models used in practice. In this talk, we will discuss how to derive convergence rates for neural networks in the over-parameterized regime. We will begin with a discussion on the approximation capacity of ReLU neural networks with certain norm constraints on the weights. By using this result, we are able to prove nearly optimal learning rates for least squares estimations based on over-parameterized (deep or shallow) neural networks if the weights are properly constrained. Finally, we will also show how to obtain minimax optimal rates for shallow neural networks by using localization technique and generalize the results to regularized least squares.

Date:	July 22, 2025 (Tuesday)
Time:	4:00 pm – 5:00 pm
Venue:	Room 210, Run Run Shaw Building HKU

All are welcome