

THE UNIVERSITY



OF HONG KONG

*Institute of Mathematical Research
Department of Mathematics*

Numerical Analysis Seminar

Optimistic Sample Size Estimate for Deep Neural Networks

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Abstract

Estimating the sample size required for a deep neural network (DNN) to accurately fit a target function is a crucial issue in deep learning. In this talk, we introduce a novel sample size estimation method based on the phenomenon of condensation, which we term the "optimistic estimate." This method quantitatively characterizes the best possible performance achievable by neural networks through condensation. Our findings suggest that increasing the width and depth of a DNN preserves its sample efficiency. However, increasing the number of unnecessary connections significantly deteriorates sample efficiency. This analysis provides theoretical support for the commonly adopted strategy in practice of expanding network width and depth rather than increasing the number of connections.

Date: September 4, 2024 (Wednesday)

Time: 2:00 pm – 3:00 pm

Venue: ZOOM: <https://hku.zoom.us/j/>

Meeting ID: 913 6532 3891

Password: 310656

All are welcome