

THE UNIVERSITY



OF HONG KONG

*Institute of Mathematical Research
Department of Mathematics*

Numerical Analysis Seminar

Operator learning is provably data-efficient

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Abstract

Can one learn a solution operator associated with a differential operator from pairs of solutions and right hand sides? If so, how many pairs are required? These two questions have received significant research attention in operator learning. More precisely, given input-output pairs from an unknown elliptic PDE, we will derive a theoretically rigorous scheme for learning the associated Green's function. By exploiting the hierarchical low-rank structure of Green's functions and randomized linear algebra, we will have a provable learning rate. Along the way, we will develop a more general theory for the randomized singular value decomposition and show how these techniques extend to parabolic and hyperbolic PDEs. This talk partially explains the success of operator networks like DeepONet in data-sparse settings.

Date: Jan. 31, 2024 (Wednesday)

Time: 10:00 – 11:00 am

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

Meeting ID: 913 6532 3891

Password: 310656

All are welcome