THE UNIVERSITY　　　　　**OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

Numerical Analysis Seminar

A deep adaptive sampling method for the approximation of high-dimensional PDEs

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Abstract

In this talk, we discuss some numerical difficulties of machine learning techniques for the approximation of high-dimensional PDEs. We pay particular attention to the quality of the random samples in the training set. When applying machine learning techniques to approximate PDEs, the random samples in the training set introduce statistical errors to the approximation. If the random samples are not consistent with the properties of the problem, the statistical errors will significantly affect the numerical accuracy, which may get worse for the high-dimensional cases. We have developed a deep adaptive sampling strategy to alleviate this issue, where we employ a deep generative model to regenerate or refine the random samples in the training set according to the properties of the problem. For example, if a physics-informed neural network (PINN) is used, we will generate the random collocation points according to the distribution induced by the residual. Numerical examples will be presented to demonstrate the effectiveness of the proposed algorithm.

Date:	September 28, 2022 (Wednesday)
Time:	10:00 – 11:00am
Venue:	ZOOM: https://hku.zoom.us/j/
	Meeting ID: 913 6532 3891
	Password: 310656

All are welcome