



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

## **PHD STUDENT SEMINAR**

# **Exploring the Training Challenges of Neural Network-Based PDE Solvers: A Singular Value Analysis**

By

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### **Abstract**

In recent years, neural networks have shown promising potential in solving partial differential equations (PDEs). However, the training process for these networks can be challenging. In this student seminar, we will delve into the analysis of training difficulty in neural network-based solvers for partial differential equations (PDEs), focusing on the distribution of singular values in kernel matrices. By conducting experiments and theoretical analyses using the Random Feature method and a two-layer neural network architecture, we explore the relationship between singular value distribution and the hardness of training. Additionally, our research highlights the essential role of automatic differentiation in training neural networks for PDEs, comparing it with finite difference cases.

**Date : 13 June 2024 (Thursday)**

**Time : 4:00pm**

**Venue : Room 5510 (Lifts 25-26)**

*All are Welcome!*