THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
應 用 數 學 系

PolyU Numerical PDEs Seminar

Mathematics for Machine Learning Algorithms: A PDE and Numerical Analysis Perspective

By

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Abstract

In this talk we shall discuss problems arising in the mathematical description, understanding and advancement of machine learning algorithms. These algorithms find applications in various scientific and engineering domains, significantly impacting key aspects of research. Mathematical analysis is essential to address several crucial questions: a) the reliability of these algorithms, b) their advantages or potential limitations compared to conventional approaches, and c) the design novel and enhanced algorithms. Emphasis will be given to the connection of ML algorithms to notions and problems related to PDEs and to Numerical Analysis. In particular, we will discuss problems related to stability, convergence, a priori and a posteriori error control of algorithms designed to learn functions as well as solutions of differential equations.

Biography

Charalambos Makridakis is the Director of the Institute of Applied and Computational Mathematics, Greece. He is Professor of Numerical Analysis at the University of Crete and Professor of Mathematics at the University of Sussex (on leave). He was founding member of the Department of Applied Mathematics and of the Archimedes Center for Modelling, Analysis and Computation in Crete. He had active role in leading European network grants related to Nonlinear Partial Differential Equations and their Applications funded by the European Commission. He received his PhD from the University of Crete in 1990; subsequently he was a post-doc at the University of Maryland, College Park and at the University of Tennessee. He held short term visiting posts at several universities and centres, including, Institute for Pure and Applied Mathematics at UCLA, University of Oxford, École Normale Superieure-Paris, CIRM-France, Institut Mittag-Leffler-Sweden and University of Rennes. Professor Makridakis is member of the Editorial Board of IMA Journal of Numerical Analysis and coordinator of the International Network 'Modelling and Computations for Shocks and Interfaces'. Reference Link: https://www.iacm.forth.gr/about/administration/director

Date: 11 September 2024 (Wednesday)
Time: 10:00-11:00 (Hong Kong Time)
Venue: TU717

ALL ARE WELCOME