THE UNIVERSITY   **OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

Numerical Analysis Seminar

Optimization and Reduced Order Models for Digital Twins

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Abstract

This talk begins by discussing the role of PDE-constrained optimization in the development of digital twins. In particular, applications to identify weaknesses in structures and aneurysms are considered. Next, we analyze a data-driven optimization problem constrained by Darcy's law to design a permeability that achieves uniform flow properties despite having nonuniform geometries. We establish well-posedness of the problem, as well as differentiability, which enables the use of rapidly converging, derivative-based optimization methods.

The second part of the talk will focus on an inexact adaptive and provably convergent semismooth Newton method for general purpose optimization problems. In particular, dynamic optimization problems, which are known to be highly expensive are the focus. A memory efficient reduced order modeling approach based on randomized matrix sketching is introduced.

Date:	Nov 16, 2023 (Thursday)
Time:	9:00am – 10:00am
Venue:	ZOOM: https://hku.zoom.us/j/
	Meeting ID: 913 6532 3891
	Password: 310656

All are welcome