THE UNIVERSITY　　　　**OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

Numerical Analysis Seminar

Multiscale Finite Element Methods for advection-diffusion problems

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Abstract

The Multiscale Finite Element Method (MsFEM) is a finite element (FE) approach that allows to solve partial differential equations (PDEs) with highly oscillatory coefficients on a coarse mesh, i.e. a mesh with elements of size much larger than the characteristic scale of the heterogeneities. To do so, MsFEMs use pre-computed basis functions, adapted to the differential operator, thereby taking into account the small scales of the problem.

When the PDE contains dominating advection terms, naive FE approximations lead to spurious oscillations, even in the absence of oscillatory coefficients. Stabilization techniques (such as SUPG) are to be adopted.

In this work, we consider multiscale advection-diffusion problems in the convection-dominated regime. We will discuss different ways to define the MsFEM basis functions, and how to combine the approach with stabilization-type methods. This is a joint work with Rutger Biezemans, Claude Le Bris and Alexei Lozinski.

Date:	October 19, 2022 (Wednesday)
Time:	4:00 – 5:00pm (Hong Kong Time)
Venue:	ZOOM: https://hku.zoom.us/j/
	Meeting ID: 913 6532 3891
	Password: 310656

All are welcome