THE UNIVERSITY   **OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

COLLOQUIUM

Multiscale modeling: Modeling subgrid effects and temporal splitting

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Abstract

In this talk, we will start with some main concepts in multiscale modeling including numerical homogenization and multiscale finite element methods. Our goal is to model processes in multiscale media without scale separation and with high contrast. We assume that the coarse grid doesn't resolve the scales and the contrast. To deal with these problems, I will introduce multiscale methods that use multicontinua approaches. These approaches use additional macroscopic variables. I will discuss the convergence of these approaches and show that these methods converge independent of the contrast. The multicontinua approaches can benefit from machine learning techniques, which I will discuss. I will also consider how multiscale methods can be used for temporal splitting.

High contrast brings stiffness to the system, which requires small time steps. We will introduce partial explicit methods that construct time discretizations with the time stepping that is independent of the contrast. Numerical results will be shown to back up our theories.

Date:	February 10, 2021 (Wednesday)
Time:	2:00pm (Hong Kong Time)
Venue:	ZOOM: https://hku.zoom.us/j/
	Meeting ID: 989 5370 8523
	Password: 614563

All are welcome