The Hong Kong University of Science and Technology

Department of Mathematics

<u>Seminar on Applied Mathematics</u>

Multiscale reduced basis methods for semiclassical Schrodinger equation with multiscale and random potentials

by

Prof. Jingrun CHEN
Soochow University

<u>**Abstract**</u>
The semiclassical Schrodinger equation with multiscale and random potentials often appears when studying electron dynamics in heterogeneous quantum systems. As time evolves, the wavefunction develops high-frequency oscillations in both the physical space and the random space, which poses severe challenges for numerical methods. We propose a multiscale reduced basis method, where we construct multiscale reduced basis functions using an optimization method and the proper orthogonal decomposition method in the physical space and employ the quasi-Monte Carlo method in the random space. Our method is verified to be efficient: the spatial grid size is only proportional to the semiclassical parameter and (under suitable conditions) almost first order convergence rate is achieved in the random space with respect to the sample number.

Date: **Friday, 13 September 2019**

Time: **3:30p.m. – 4:30p.m.**

Venue: **Room 3472, Academic Building (Lifts 25-26), HKUST**

All are welcome!