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Seminar

A Bi-fidelity method for multiscale kinetic equations with uncertainties

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Abstract

In this talk, we introduce a bi-fidelity numerical method for solving high-dimensional parametric kinetic equations. We first briefly discuss about the Boltzmann equation and its fluid dynamic limit, then introduce a bi-fidelity stochastic collocation method for its uncertainty quantification problem. By combining computational efficiency of the low-fidelity model--chosen as the compressible Euler system--with high accuracy of the high-fidelity (Boltzmann) model, our bi-fidelity approximation can successfully capture well the macroscopic quantities of solution to the Boltzmann equation in the random space. A uniform error estimate of the bi-fidelity method, based on a series of our theoretical work on hypocoercivity for the uncertain Boltzmann equation, will be shown. Lastly we present numerical results to validate the efficiency and accuracy of our proposed method.

Date: 20 January 2020 (Monday)
Time: 2:30pm – 3:30pm
Venue: Room 222, Lady Shaw Building,
         The Chinese University of Hong Kong, Shatin

All are Welcome