Department of Mathematics
The Chinese University of Hong Kong

數學系
香港中文大學

Phone: (852) 3943 7988 ● Fax: (852) 2603 5154 ● Email: dept@math.cuhk.edu.hk
Room 220, Lady Shaw Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

Colloquium

High-order Conservative Characteristic Methods for Environmental Modelling

Professor Dong Liang
York University, Canada

Abstract

Modeling atmospheric environment is a difficult problem. The temporal and spatial variation of aerosols are influenced by numerous physical and chemical processes, such as emission, aerosol chemistry, aerosol dynamics, and spatial convection and diffusion, etc. Aerosol transport computation may be carried out at continental or global scales for long term simulations. In this talk, we present our new development of a spatial fourth-order and temporal second-order conservative characteristic finite volume method for solving atmospheric pollution convection diffusion problems. While the characteristics tracking is applied to treat the convection term, we use conservative high-order interpolation to treat the convective integrals over the irregular tracking volume cells at the previous time level. A temporal discretization by averaging along the characteristics is proposed for the diffusion term, where the diffusion fluxes are approximated by fourth-order spatial discrete operators that provide continuity of the discrete fluxes cross the edges of volume cells and tracking volume cells. Numerical experiments verify the temporal and spatial accuracy as well as mass conservative property. Realistic pollution problems are simulated by the developed algorithm.

Date:　22 July 2019 (Monday)
Time:　11:00am - 12:00noon
Venue:　Room 222, Lady Shaw Building,
　　　　The Chinese University of Hong Kong, Shatin

All are Welcome