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The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Scientific Computation

**A hybrid Hermite WENO scheme for hyperbolic
conservation laws**

By

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Abstract

In this presentation, we propose a class of hybrid high order finite volume Hermite weighted essentially non-oscillatory (HWENO) scheme, with Total Variation Diminishing Runge-Kutta time discretization for solving hyperbolic conservation laws. The zeroth-order and the first-order moments are used in the spatial reconstructions. The main idea of the hybrid HWENO scheme is that we first use a shock detection technique to identify the discontinuous, then, if the cell is identified as a troubled-cell, then we modify the first order moment in the troubled-cell and employ HWENO reconstruction in spatial discretization, otherwise, we directly use high order linear reconstruction. Compared with other HWENO schemes, the one advantage is its simpleness as we only use one set of stencil for spatial discretization, and the second advantage is its higher efficiency for using linear approximation straightforwardly in smooth regions. Meanwhile, the hybrid HWENO scheme still keeps the compactness. A collection of benchmark numerical tests for one and two dimensional cases are performed to demonstrate the numerical accuracy, high resolution and robustness of the proposed scheme.

Date: Wednesday, 7 August 2019

Time: 10:00a.m.-11:00a.m.

**Venue: Room 3494, Academic Building
(near Lifts 25 - 26), HKUST**

All are welcome!