The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

Hermite WENO schemes for hyperbolic conservation laws

By

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Abstract

In this presentation, we would give a brief review on a class of high-order weighted essentially non-oscillatory (WENO) schemes which are based on Hermite polynomials and termed HWENO (Hermite WENO) schemes, for solving nonlinear hyperbolic conservation law systems. The con- struction of HWENO schemes is based on a finite volume formulation, Hermite interpolation, and nonlinearly stable Runge-Kutta methods. The idea of the reconstruction in the HWENO schemes comes from the original WENO schemes, however both the function and its first deriva- tive values are evolved in time and used in the reconstruction, while only the function values are evolved and used in the original WENO schemes. Comparing with the original WENO schemes of Liu et al. [J. Comput. Phys. 115 (1994) 200] and Jiang and Shu [J. Comput. Phys. 126 (1996) 202], one major advantage of HWENO schemes is its compactness in the reconstruction. For example, five points are needed in the stencil for a fifth-order WENO (WENO5) reconstruction, while only three points are needed for a fifth-order HWENO (HWENO5) reconstruction in one dimensional case. Numerical results are presented for both one and two dimensional cases to show the efficiency of the schemes.

Date: 28 February 2022 (Monday)
Time: 10:00-11:00 (Hong Kong Standard Time GMT +8)
Venue: Online Talk via Zoom (Meeting ID: 999 0587 7973)
Speaker: Prof. Jianxian Qiu, Xiamen University
Host: Prof. Zhonghua Qiao, The Hong Kong Polytechnic University
Click to join:
https://polyu.zoom.us/j/99905877973?pwd=cllneFY0dkFBMFp4OVVESXJ5d0h3UT09

Click to join

* * * ALL ARE WELCOME * * *

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 27 February 2022