六月份《现代力学研究与进展》讲座

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题 目：Adaptive Filtering and Limiting in Compact High Order Methods for Multi-scale Gas Dynamics and MHD Systems

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时 间：2007年6月14日(周四)上午10:00

地 点：所小礼堂外

要求全体研究生(含在职人员以同等学力申请学位者)准时参加并考勤。

欢迎博士后、科研人员和其他感兴趣的同志参加。

人事教育处

2007年6月12日

Our adaptive multi-step high order filter schemes employing multi-resolution wavelet analysis of computed flow data to control the types and amount of numerical dissipations have been extended to include high order compact base scheme operators. This is a follow on study initiated in 2005 with numerical experiments on a variety of gas dynamics and MHD multi-scale test cases. Akin to the high order central spatial base scheme, the combination of the compact base scheme with multi-step nonlinear (containing flux limiters) and compact linear filters can capture multi-scale shock interactions far better than their standard shock-capturing counterparts. However, among the various test cases, we arrive at the same conclusion drawn in our previous study on the behavior of compact spatial schemes for problems containing multi-scale shock interaction. High order compact schemes are methods of choice for many incompressible and low speed turbulent/acoustic flows due to their advantage of requiring very low number of grid points per wavelength. In the presence of multi-scale shock interactions and under our filter framework, however, this desired property of high order compact base schemes seems to have diminished in both the gas dynamic and MHD test cases that we have studied (compared with the same order of accuracy of non-compact central base schemes). Also the compact spatial base scheme requires more CPU time per time step and it is less compatible with parallel computations than the central spatial base scheme. Consequently, the compact spatial base scheme requires added CPU time in a parallel computer framework.