Sulin Wang and Zhengfu Xu* (zhengfux@mtu.edu). Total variation bounded high order finite difference methods for one-dimensional conservation laws.

Provable total variation bounded high order (at least third order) method based on variation measured on grid values will be discussed in this talk. Most of the conventional design of TVB methods is based on Harten’s criteria. However, to strictly follow Harten’s TVD criteria, one can only provide methods of at most second order. Popular ENO/WENO methods are very successful in producing robust numerical results with great performance of suppressing oscillations around discontinuities. However, it is still elusive to prove ENO/WENO methods are TVB. As one of the most important properties we desire for numerical methods solving conservation laws, provable TVB property is at the center of this talk. A new criteria will be provided to design TVB high order finite difference scheme for one-dimensional problems (Received July 25, 2017)