ANDY WAN, McGill University

The multiplier method to construct conservative finite difference schemes for ordinary and partial differential equations

We present the multiplier method of constructing conservative finite difference schemes for ordinary and partial differential equations. Given a system of differential equations possessing conservation laws, our approach is based on discretizing conservation law multipliers and their associated density and flux functions. We show that the proposed discretization is consistent for any order of accuracy and that by construction, discrete densities can be exactly conserved. In particular, the multiplier method does not require the system to possess a Hamiltonian or variational structure. Examples, including dissipative problems, are given to illustrate the method. This is joint work with Alexander Bihlo at Memorial University and Jean-Christophe Nave at McGill University.