Special Guest Lectures

Discontinuous Galerkin Methods for the Shallow Water Equations

Yulong Xing, Oak Ridge National Laboratory

Digital Media Center 1034
September 19, 2014 - 01:30 pm

Abstract:

Shallow water equations (SWEs) with a non-flat bottom topography have been widely used to model flows in rivers and coastal areas. Since the SWEs admit non-trivial steady-state solutions, extra care need to be paid to approximate the source term numerically. Another important difficulty arising in the simulations is the appearance of dry areas. In this presentation, we will talk about recently developed high-order discontinuous Galerkin (DG) finite element methods, which can capture the general moving steady state well, and at the same time are positivity preserving without loss of mass conservation. Some numerical tests are performed to verify the positivity, well-balanced property, high-order accuracy, and good resolution for smooth and discontinuous solutions.

Speaker's Bio:
Yulong Xing obtained his Ph.D. in Mathematics from Brown University, and studied in the area of high-order accurate numerical methods for hyperbolic conservation laws. He then spent three years at Courant Institute, New York University, working in the area of multiscale modeling and computation for complex geophysical flows.

He is currently a research staff scientist at Oak Ridge National Laboratory and an assistant professor at the Department of Mathematics, University of Tennessee. His research interest is mainly in scientific computing and numerical analysis, more specifically, developing and analyzing efficient/accurate numerical methods for partial differential equations arising from geophysical flows and other applications.

Center for Computation & Technology
2003 Digital Media Center • Telephone: +1 225/578-5890 • Fax: +1 225/578-8957